

Service  
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LightFrame™ 3



Model: 109B60/00

# Service Manual

Horizontal Frequencies  
30 - 97KHz

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## SAFETY NOTICE

ANY PERSON ATTEMPTING TO SERVICE THIS CHASSIS MUST FAMILIARIZE HIMSELF WITH THE CHASSIS AND BE AWARE OF THE NECESSARY SAFETY PRECAUTIONS TO BE USED WHEN SERVICING ELECTRONIC EQUIPMENT CONTAINING HIGH VOLTAGES.

CAUTION: USE A SEPARATE ISOLATION TRANSFORMER FOR THIS UNIT WHEN SERVICING.

REFER TO BACK COVER FOR IMPORTANT SAFETY GUIDELINES

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# Important Safety Notice

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Proper service and repair is important to the safe, reliable operation of all Philips Consumer Electronics Company\*\* Equipment. The service procedures recommended by Philips and described in this service manual are effective methods of performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It is also important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Philips could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Philips has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Philips must first satisfy himself thoroughly that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

\* \* Hereafter throughout this manual, Philips Consumer Electronics Company will be referred to as Philips.

## WARNING

Critical components having special safety characteristics are identified with a ▲ by the Ref. No. in the parts list and enclosed within a broken line\* (where several critical components are grouped in one area) along with the safety symbol ▲ on the schematics or exploded views.

Use of substitute replacement parts which do not have the same specified safety characteristics may create shock, fire, or other hazards.

Under no circumstances should the original design be modified or altered without written permission from Philips. Philips assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.

\* Broken Line



### FOR PRODUCTS CONTAINING LASER :

- DANGER-** Invisible laser radiation when open.  
AVOID DIRECT EXPOSURE TO BEAM.
- CAUTION-** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- CAUTION-** The use of optical instruments with this product will increase eye hazard.

TO ENSURE THE CONTINUED RELIABILITY OF THIS PRODUCT, USE ONLY ORIGINAL MANUFACTURER'S REPLACEMENT PARTS, WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THIS SERVICE MANUAL.

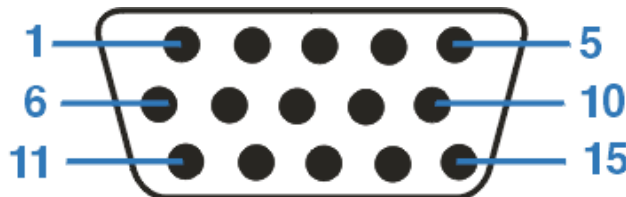
## I. Basic Data

- Description :Auto-Scan Ultra High Resolution Digital Color Monitor
- Commercial Release : Sep, 20, 2004
- CRT:
  - Screen size : 19" Flat Square Convention tube
  - Diagonal VIS : 18"
  - Shadow Mask : Invar
  - Dot Pitch : 0.26mm for SDI, LG & CPT CRT
  - Horizontal pitch : 0.21mm for SDI, LG & CPT CRT
  - Deflection angle : 90 degrees
  - Aspect ratio : 4:3
  - Source : LG/SDI/CPT
  - Surface : Anti-reflection / Anti-static
  - Visible screen area : 360 mm x 270 mm
  - Black matrix : Yes
  - Phosphors : P22
  - Magnetic field : North
- Commercial name : Philips
- Scanning Frequency
  - Horizontal : 30 - 97 KHz
  - Vertical : 50 - 160 Hz
- Maximum resolution : 1920 x 1440 @ 60 Hz
- Recomm. resolution : 1280 x 1024 @ 75 Hz
- Over-scan : Yes
- Monitor modes
  - Factory modes : 40
  - User modes : 16

Item	Resolution	Freq. V x H	Pixel rate(Mhz)	Remark
1	640x480	60(31.469k)	25.175	VGA
2		72(37.861k)	31.500	VESA
3		75(37.500k)	31.500	VESA
4 @		85(43.269k)	36.000	VESA
5		100(50.60k)	40.500	SNI
6		67(35.0k)	30.240	MAC -
7	640x350	70(31.5k)	25.100	VGA
8		85(37.8k)	31.500	VESA
9 @	720x400	70(31.469k)	28.321	VGA
10		85(37.927k)	35.500	VESA
11	800x600	60(37.879k)	40.000	VESA
12		72(48.077k)	50.000	VESA
13		75(46.875k)	49.500	VESA
14 @		85(53.674k)	56.250	VESA
15		100(63.90k)	67.500	SNI
16		56(35.16k)	36.000	VESA
17		90(60.4k)	65.227	SIEMENS
18	832x624	75(49.725k)	57.280	MAC -
19 @	1024x768	60(48.363k)	65.000	VESA
20 @		70(56.476k)	75.000	VESA
21		75(60.000k)	78.750	VESA
22 @		85(68.677k)	94.500	VESA
23 @		90(72.54k)	99.82	SIEMENS
24 @	1152x864	70(63.850k)	94.500	VESA
25		75(67.500k)	108.000	VESA
26		85(77.090k)	121.500	VESA
27	1152x870	75(68.681k)	100.000	MAC
28	1152x900	76(71.800k)	108.000	SUN
29	1280x960	60(60.000k)	108.000	VESA
30 @		85(85.938k)	148.500	VESA
31	1280x1024	60(63.981k)	108.000	VESA
32 @		75(79.976k)	135.000	VESA
33 @		85(91.146k)	157.500	VESA
34	1600x1200	60(75.000k)	162.000	VESA
35		65(81.250k)	175.500	VESA
36 @		70(87.500k)	189.000	VESA
37 @		75(93.75k)	202.50	VESA
38	1792x1344	60(83.640k)	204.750	VESA/P
39	1856x1392	60(86.330k)	218.250	VESA/P
40	1920x1440	60(90.000k)	234.000	VESA/P

" @ " Denote it is a preset mode ,others are preload modes.

Input signal Pin assignment:



PIN No.	SIGNAL
1	Red
2	Green
3	Blue
4	Sense (GND)
5	Self Test
6	Red GND
7	Green GND
8	Blue GND
9	Not connect
10	Sync GND
11	Sense (GND)
12	Bi-directional data(SDA)
13	H-sync
14	V-sync
15	DDC Data clock(SCL)

## II. Picture Performance

- Display size
  - Recommended : 355 x 265mm
  - Maximum : 360 x 270mm
- Max video pixel : 234 Mhz
- Rise/Fall time : < 6.5ns / < 6.5ns
- Misconvergence
  - (A/C zone) : ≤ 0.25 / 0.35 (Zone A / C is 0.3 / 0.4 When ? 45kHz).
  - center : ≤ 0.15
- Geometry distortion
  - |Top|, |Bottom| : ≤ 2.0 mm
  - |Left|, |Right| : ≤ 2.0 mm
  - |Top + Bottom| : ≤ 3.5 mm
  - |Left + Right| : ≤ 3.5 mm
  - Waviness per 50 mm: 1.0 mm max. at maximum video size
  - Slope polarity changes: 1.0 mm max.
  - Tilt : ≤ 2.0mm
- Image rotation : 1 degree adjustable
- Horizontal / Vertical linearity:
  - 12 equal blocks along horizontal axis,
  - 9 equal blocks along vertical axis. (see Fig-1)
  - Horizontal frequency <33KHz 33K~ 65KHz >65KHz
  - Horizontal non-linearity: ≤ 7.5 % ≤ 6.5 % ≤ 6 %
  - Vertical non-linearity: ≤ 5 % ≤ 5 % ≤ 5 %
  - Horizontal two adjacent: ≤ 6 % ≤ 6 % ≤ 5 %
  - Vertical two adjacent: ≤ 5 % ≤ 5 % ≤ 5 %
  - H. linearity =  $\frac{X_{max} - X_{min}}{X_{max} + X_{min}} \times 100\%$
  - V. linearity =  $\frac{Y_{max} - Y_{min}}{Y_{max} + Y_{min}} \times 100\%$
- Image stability after warm-up 30 minutes.
  - As a function of brightness : < 1.0 %
  - As a function of supply input voltage: < 1.0 %
  - As a function of temperature : < 1.0 %
- Brightness uniformity : > 75 %
- White uniformity : x, y < +/- 0.015
- Display Centering : |A-B| or |C-D| < 6 mm(for all preset modes)
- White color CIE coordinates
  - @ 9300K+/-27MPCD : x = 0.283 +/- 0.015, y = 0.297 +/- 0.015
  - @ 6500K+/-27MPCD : x = 0.313 +/- 0.015, y = 0.329 +/- 0.015
  - @ 5500K+/-27MPCD : x = 0.332 +/- 0.015, y = 0.347 +/- 0.015
  - @ sRGB : x = 0.313 +/- 0.015, y = 0.329 +/- 0.015
- White tracking: +/- 0.015 on center with light output from 3 FL to max FL.
- Brightness output: (9300 K) 68.67K/85Hz
  - Brightness Contrast FW Pattern 10X10cm block
  - Control Control fL fL
  - Min Min < 0.2
  - Center Min ≤ 0.25
  - Center Max 30 +/- 2.5 41 +/- 3

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14.1. sRGB luminance (Full white pattern): at 68.67K/85Hz, regardless of brightness and contrast controls: 23 +/- 2.5 FL

15. Image shift range: Horizontal: > 10 mm, +/-3 from center to each side.  
Vertical: > 8 mm, +/-2 from center to each side.

### III. Customer Relevance

1. Front Controls : Contrast tact switch control  
(Left to Right) (With Decrease and Increase)  
Brightness tact switch control  
(With Decrease and Increase)  
OSD menu tact switch control  
Power on/off button  
2. Rear Control : 15-pin D-sub I/F cable.  
Digital OSD Controls

- Language .Chinese  
.English  
.Espanol  
.Francais  
.Deutsch  
.Italiano  
.Portuguese  
.Korean
- Zoom .Zoom  
- Adjust Horizontal .Position  
.Size  
- Adjust Vertical .Position  
.Size  
- Adjust Shape .Adjust side curve .Pincushion  
.Balanced  
.Adjust side angles. Trapezoid  
.Parallelogram  
.Rotate image .Rotate  
- Adjust Color .9300K for general use  
.6500K for image management  
.5500K for photoretouch  
.sRGB  
.User Preset R, G, B  
- Reset to factory settings .No  
.yes  
- Extra controls .Adjust moire .Horizontal  
.Vertical

Degauss  
.LightFrame < Off On >  
.Serial No.  
Resolution  
.Frequency

- Model select (under factory mode) CPT CRT: set 109B6 CPT ON  
LPD & SDI CRT: set 109B6 LG & SDI ON  
.SWDDC set ON  
.LF ON OSD set ON  
.LF3 set ON

- Close main controls

(More details about structure are provided in Software CRS)

3. Rear Inter connection: Power Cord: 1.8 m plugable, 3 lead with ground lead  
I/F connectors : 15 pin 1.8m D-sub flying in cable  
4. DDC : Compliant with the VESA DDC2B standards  
See DDC DATA

	DDC1	DDC2B
Software		V
Hardware		

\*\*Note1: 78&79 Factory code

Brazil : HC(48H,43H)  
Chung-Li : TY(54H,59H)  
Delta : GK(47H,4BH)  
Suzhou : BZ(42H,5AH)  
Juarez : YA(59H,41H)  
Shenzhen : CX(43H,58H)  
Szombathely : HD(48H,44H)  
Raleigh : IO (49H,4FH)  
Series No. address : 82,83,84,85,86,87,88,89

5. Mains Voltage Range: 195 - 264 or 90-264 V<sub>rms</sub>

6 Input Line Frequency: 47 - 63 Hz

7. Power consumption : < 75W (at 220Vac mains)

< 78W (at 110Vac mains)

8. Power LED green (non-protruding)

9. Power Management TCO-99, EPA and E2000  
Functionality: Status LED color  
On green (normal operation)  
Off flash green (< 1.0W)

10. Low radiation : TCO / MPR

11. Separated EHT : Yes

12. DAF : Yes

13. Self test : Yes

### IV. Quality

1. MTBF : > 75000 hr. (excl. CRT)

2. Target F.C.R. : target ≤ 2 % (first 12 months)

3. Environment : operating/non-operating shipping/storage

Temperature 0 to 40 -25 to 65

Humidity 10 % to 90 % 5 % to 95 %

no condensation incl. condensation

but excl. rain

Altitude: 10000 ft 39000 ft

Shock/vibration : According DSD standard

4. Environmental issues : CRT, cabinet and components must be free of CFC's,

PBBE's, PBDE's, cadmium, (TCO99)

All documentation printed on recycled paper

Accessories packed in buffer without additional

wrapping

All other issues according CE and BU Environmental

Policy

### V. Regulatory Compliance

1. Safety & Ergonomics: UL1950

CSA-22.2 No. 950-M89

IEC 950

ZH1/618

EN60950

EMKO-TSE (74SEC) 207/94

ISO 9241-3 / ISO 9241-7 / ISO 9241-8

E-2000, EPA, Nutek, TUV/GS, TCO .

2. EMI/RFI/EMS : EN 55022 class B

FCC Part 15 (class B)

D.O.C. (class B)

CISPR 22 (class B)

C-tick, CE(Europe)

EMS: EN61000-4-3(80% 1KHz AM modulation) picture jitter<=4mm

3. X-Ray : DHHS 21 CFR Subchapter J

Rontgen Verordnung Rov 1987-01-08

4. EMC standards : EN 50082-1

EN 60555-2

5. Low Radiation : TCO / MPR

6. Compatibility PC99, Windows2000, Windows ME, PC2001  
Windows XP.

### VI. Approbation Compliance

1. Approvals & Certifications: UL, CSA, SEMKO, TUV/GS,

FCC Class B, DOC. Class B, BZT, VCCI class 2,

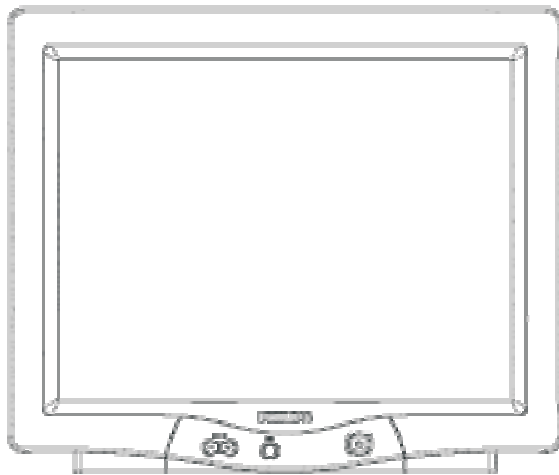
FDA (DHHS), Rontgen, TUV/Ergonomics, CE (98,

prepared), B"- mark for Poland, C" tick for Australia

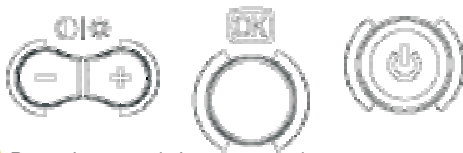
PSB(Singapore), BCIQ, CCIB



Front View

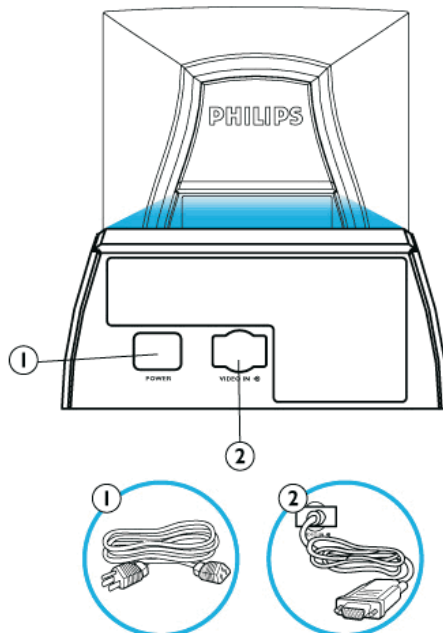


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- ⓘ Power button switches your monitor on.
- ⓘ OK button which when pressed will take you to the OSD controls
- ⓘ Contrast hotkey. When the "-" button is pressed, the adjustment controls for the CONTRAST will show up.
- ⓘ Brightness hotkey. When the "+" button is pressed, the adjustment controls for BRIGHTNESS will show up.
- ⓘ "-" and "+" buttons, are used for adjusting the OSD of your monitor

Rear View



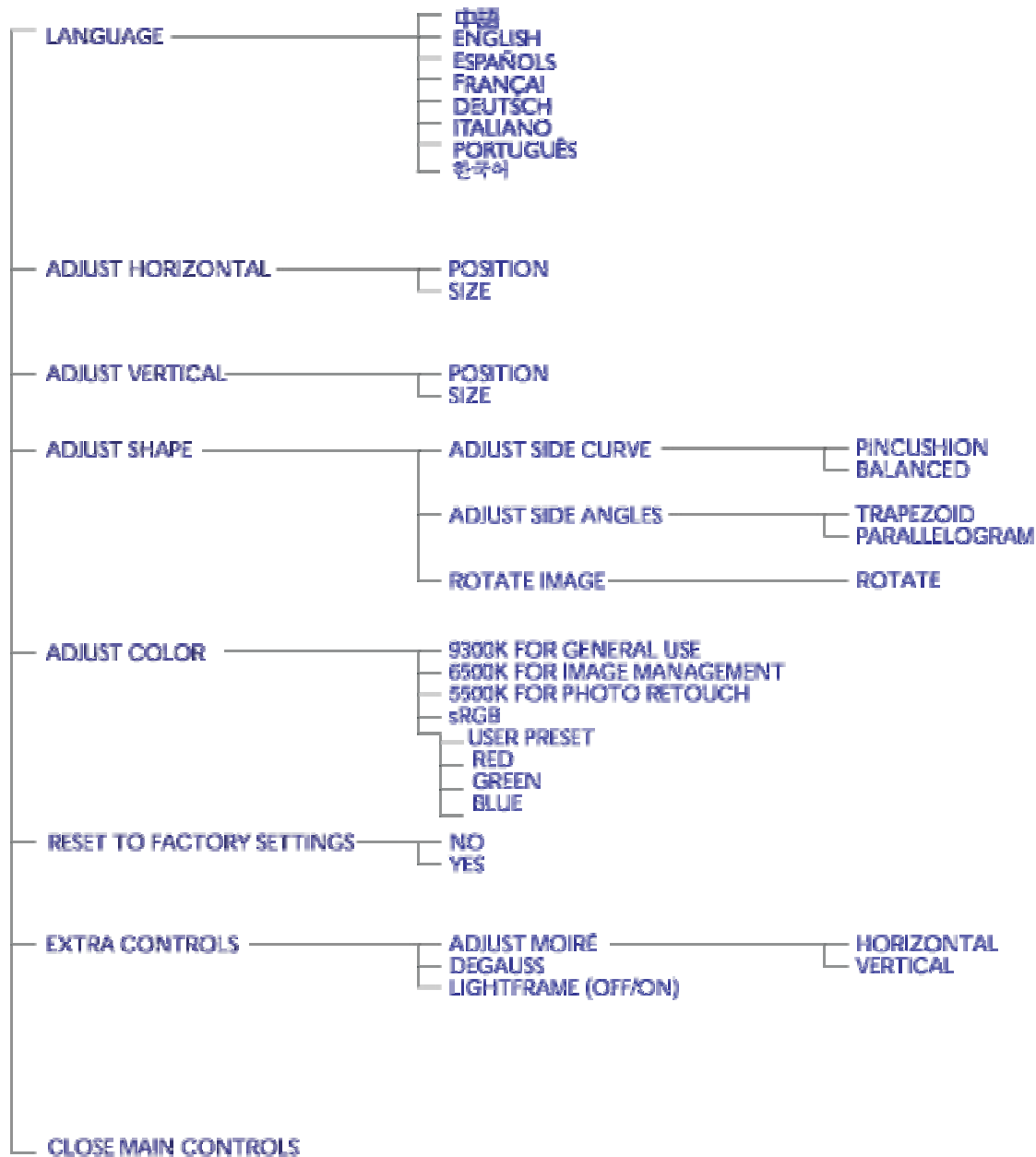
1. Power in - attach power cable here.
2. Video In - this is a cable which is already attached to your monitor. Connect the other end of the cable to your PC.

# Trouble Shooting

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Having this problem?	Check these items
No Picture (Power LED not lit)	Make sure the Power cable is plugged into the power outlet and back of the monitor.
	Power button in the front of your monitor should be in the ON position.
	Disconnect the monitor from the power outlet for about one minute.
No Picture (Power LED is flashing green)	Make sure the computer is turned on.
	Make sure the monitor cable is properly connected to your computer.
	Check to see if the monitor cable has bent pins. The Energy Saving feature may be activated
No Picture (Power LED is green)	Make sure the Brightness and Contrast controls are set correctly.
	Make sure the monitor cable is properly connected to your computer.
	Check to see if the monitor cable has bent pins.
	Make sure the computer Power button is on.
Screen doesn't show when you turn on the monitor	Make sure the monitor cable is properly connected to your computer. (Also refer to the Quick Start Guide).
	Check to see if the monitor cable has bent pins.
	Make sure the computer is turned on.
No color or intermittent color	If you are using a non-VESA-DDC standard video card, turn the DDC1 / 2B feature Off.
Color appears blotchy	The picture may need degaussing.
	Remove any nearby magnetic objects.
	Face the monitor toward the East for the best picture quality.
Missing one or more colors	Check the Color Temperature.
	Make sure the monitor cable is properly connected to your computer.
	Check to see if the monitor cable has bent pins.
Dim Picture	Adjust the Brightness and Contrast controls.
	Check your video card and it's owner's manual instructions for it may be a non-VESA-DDC Standard card.
Picture is too large or too small	Adjust the Horizontal and/or Vertical Size.
Edges of the picture are not square	Adjust the Zoom.
Picture has a double image	Adjust the geometry
	Eliminate the use of a video extension cable and/or video switch box.
Picture is not sharp	Face the monitor toward the East for the best picture quality
	Check to make sure Moiré is switched off.
	Adjust Sync Input.
Unstable Picture	Increase your refresh rate
Problem with On Screen Display	Refer to the instructions and troubleshooting information in that chapter.

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\* Specifications are subject to change without prior notice.


# OSD Adjustments

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## The OSD Controls

### BRIGHTNESS

To adjust your screen's brightness, follow the steps below. Brightness is the overall intensity of the light coming from the screen. A 50% brightness is recommended.

- 1) Press the  button on the monitor. The BRIGHTNESS window appears.



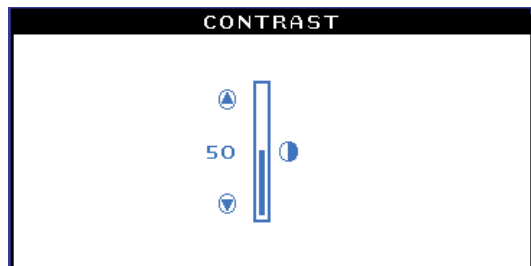
- 2) Press the  or  button to adjust the brightness.
- 3) When the brightness is adjusted to the level desired. Stop pressing the  or  button and after three seconds the BRIGHTNESS window will disappear with the new adjustment saved.





**Smart Help** After the BRIGHTNESS window has disappeared, to continue to the CONTRAST window, follow the steps under CONTRAST.

### CONTRAST

To adjust your screen's contrast, follow the steps below. Contrast is the difference between the light and dark areas on the screen. A 100% contrast is recommended.

- 1) Press the  button on the monitor. The CONTRAST window appears.





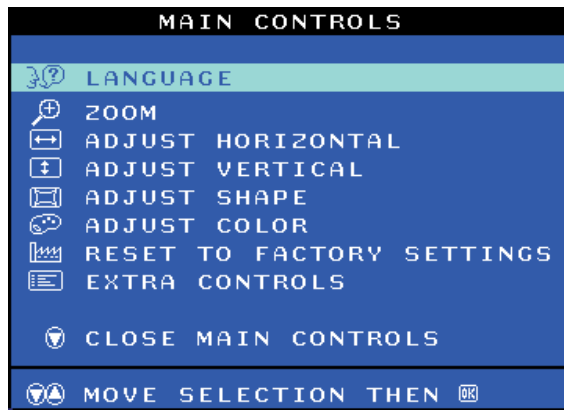
- 2) Press the  or  button to adjust the contrast.
- 3) When the contrast is adjusted to the level desired, stop pressing the  or  button and after three seconds the CONTRAST window will disappear with the new adjustment saved.

**Smart Help** After the CONTRAST window has disappeared, to continue to the MAIN CONTROLS, follow the steps under LANGUAGE.

### LANGUAGE


The ON SCREEN DISPLAY shows its setting in one of eight languages. The default is English, but you can select French, Spanish, German, Italian, simplify-Chinese, Korea, Brazilian or Portuguese.

- 1) Press the  button the monitor. The MAIN CONTROLS window appears. LANGUAGE should be highlighted.
- 2) Press the  button again. The LANGUAGE window appears.



- 3) Press the  or  button until the desired language is highlighted.






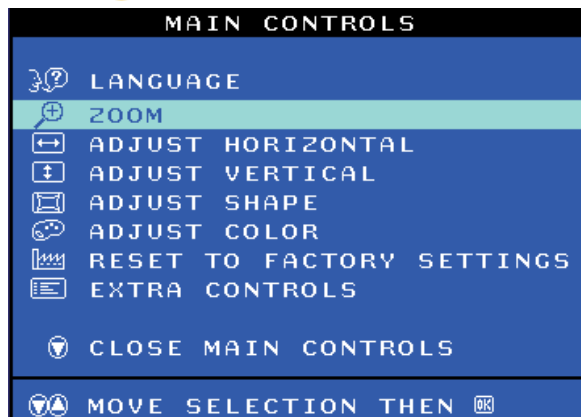
- 4) press the  button to confirm your selection and return to MAIN CONTROLS window. Close MAIN CONTROLS will be highlighted...

**Smart Help** After returning to MAIN CONTROLS.....to continue to ZOOM.

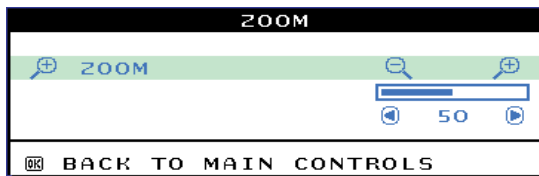
### ZOOM




ZOOM increase or decrease the size of the images on your screen. To adjust the ZOOM follow the steps below.



- 1) Press the  button on the monitors. The MAIN CONTROLS window appears.
- 2) Press the  or  button until ZOOM is highlighted.




- 3) Press the  button. The ZOOM window appears.






- 4) Press the  or  button to adjust ZOOM.
- 5) Press the  button to confirm your selection and return to the MAIN CONTROLS window. Close MAIN CONTROLS will be highlighted.

**Smart Help** After returning to MAIN CONTROLS...  
 ... to continue to ADJUST HORIZONTAL, press the  or  button until ADJUST HORIZONTAL is highlighted. Next, follow steps 3-7 under ADJUST HORIZONTAL.


... To exit completely, press the  button.

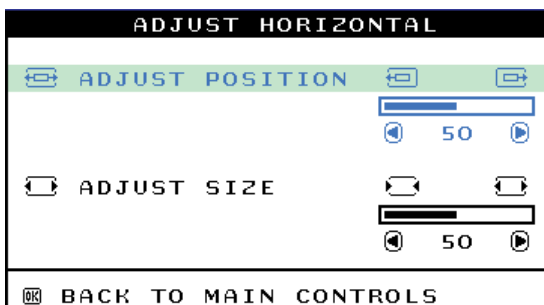
### ADJUST HORIZONTAL





ADJUST HORIZONTAL under ADJUST HORIZONTAL shifts the image on your screen either to the left or right. Use this feature if your image does not appear centered. ADJUST SIZE under ADJUST HORIZONTAL expands or controls the image on your screen, pushing it out toward the left and right sides or pulling it in toward the center.

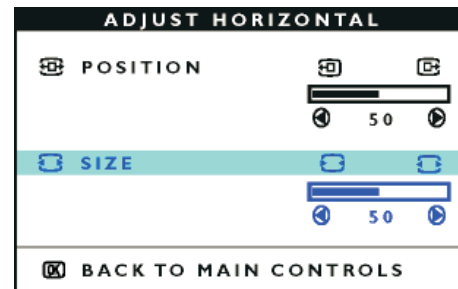
- 1) Press the  button on the monitor. The MAIN CONTROLS window appears.
- 2) Press the  or  button until ADJUST HORIZONTAL is highlighted.








- 3) Press the  button. The ADJUST HORIZONTAL window appears. ADJUST POSITION should be highlighted.



- 4) Press the  or  button to move the image to the left or right.
- 5) When the position is adjusted, press the  button to return to MAIN CONTROLS window, or press the  to highlight ADJUST SIZE.





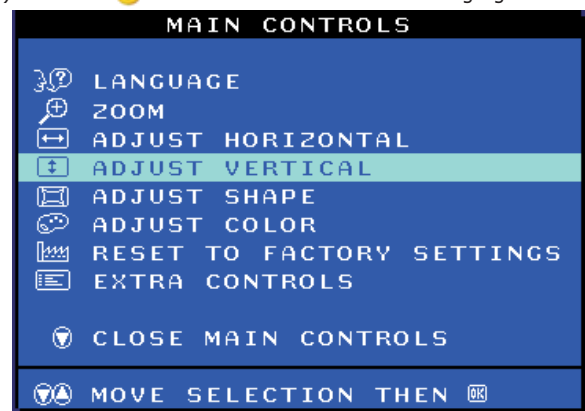
- 6) To adjust the horizontal size, press the  or  button.
- 7) When the size is adjusted, press the  button to return to MAIN CONTROLS window. CLOSE MAIN CONTROLS will be highlighted.


**Smart Help** After returning to MAIN CONTROLS...  
 ... To continue to ADJUST VERTICAL, press the  button until ADJUST VERTICAL is highlighted. Next, start with step 3 under ADJUST VERTICAL and follow the directions.  
 ...To exit completely, press the  button.

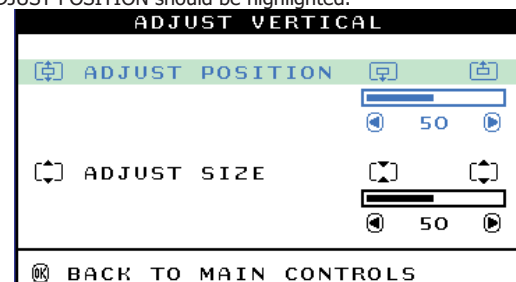
### ADJUST VERTICAL

ADJUST POSITION under ADJUST VERTICAL shifts the image on your screen either up or down. Use this feature if your image does not appear centered. ADJUST VERTICAL expands or controls the image on your screen, pushing it out toward the top or bottom or pulling it in toward the center.

- 1) Press the  button on the monitor. The MAIN CONTROLS window appears.
- 2) Press the  button until ADJUST VERTICAL is highlighted.

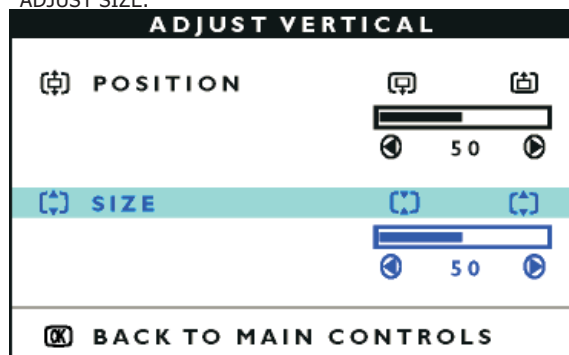


- 3) Press the  button. The ADJUST VERTICAL window appears. ADJUST POSITION should be highlighted.



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- 4) Press the or button to move the image up or down.
- 5) When the position is adjusted, press the button to return to MAIN CONTROLS window, or press the button to highlight ADJUST SIZE.



- 6) To adjust the vertical size, press the or button.
- 7) When the size is adjusted, press the button to return to MAIN CONTROLS window. CLOSE MAIN CONTROLS will be highlighted.

Smart Help After returning to MAIN CONTROLS...

... To continue to ADJUST SHAPE, press the button until ADJUST SHAPE is highlighted. Next, start with step under ADJUST SHAPE and follow the directions.

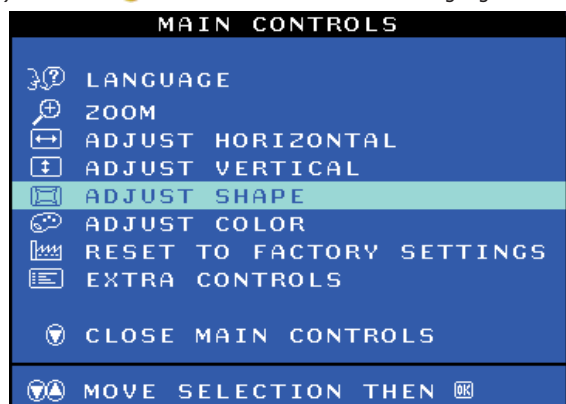
... To exit completely, press the button.

## ADJUST SHAPE

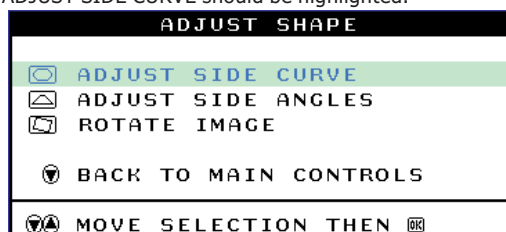
### ADJUST SIDE CURVE

ADJUST SIDE CURVE under ADJUST SHAPE allows you to adjust two of the five preset options. These two options are PINCUSHION and BALANCED pincushion. Note: use these features only when the picture is not square.

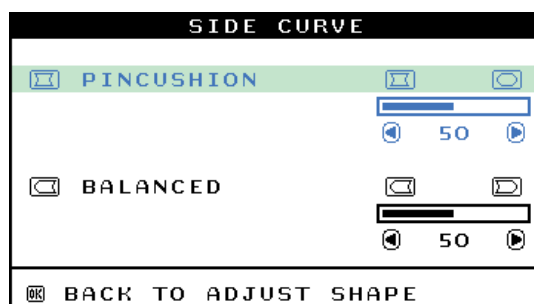
- 1) Press the button on the monitor. The MAIN CONTROLS window appears.
- 2) Press the button until ADJUST SHAPE is highlighted.



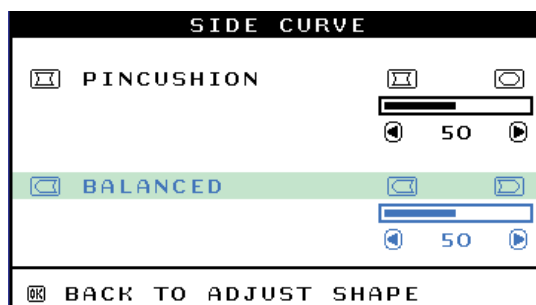
- 3) Press the button. The ADJUST SHAPE window appears. ADJUST SIDE CURVE should be highlighted.



- 4) Press the button. The SIDE CURVE window appears. PINCUSHION should be highlighted.



- 5) To adjust the pincushion, press the or button, then press the button to save your selection.
- 6) When the pincushion is adjusted, press the button to highlight BALANCE or press the button to return to the ADJUST SHAPE window.



- 7) To adjust the balanced, press the or button.
- 8) When the balanced is adjusted, press the button. BACK TO ADJUST SHAPE will be highlighted.
- 9) Press the button to return to the ADJUST SHAPE window, then press the button until ADJUST SIDE ANGLES is highlighted.

Smart Help After returning to MAIN CONTROLS...

... To continue to ADJUST SIDE ANGLES, start with step 5 under ADJUST SIDE ANGLES and follow the directions.

...To exit completely. Press the button twice.

## ADJUST SIDE ANGLES

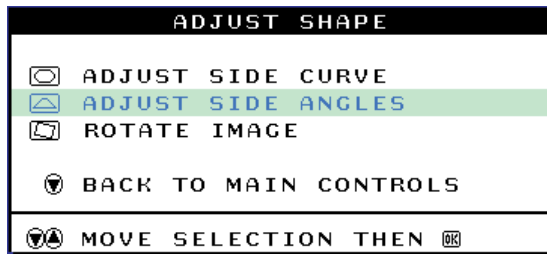
ADJUST SIDE ANGLES under ADJUST SHAPE allows you to adjust two of the five preset options. These two options are TRAPEZOID and PARALLELOGRAM. Note: use these features only when the picture is not square.

- 1) Press the button on the monitor. The MAIN CONTROLS window appears.
- 2) Press the button until ADJUST SHAPE is highlighted.

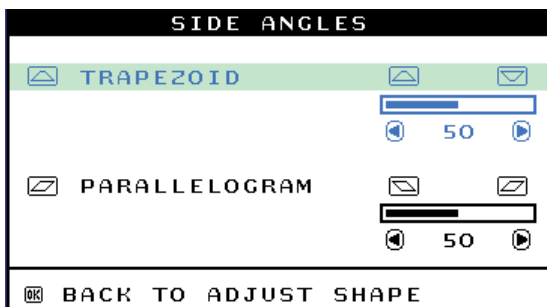




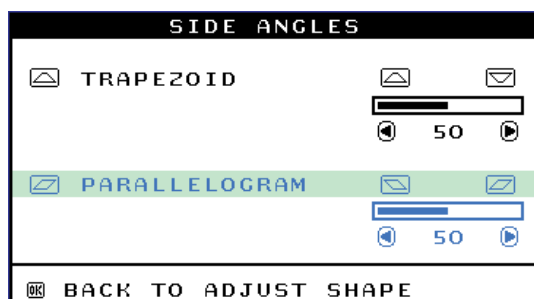
- 3) Press the button. The ADJUST SHAPE window appears.



- 4) Press the button to highlight ADJUST SIDE ANGLES.  
 5) Press the button. The SIDE ANGLES window appears. TRAPEZOID should be highlighted.



- 6) To adjust the trapezoid, press the or button, then press the button to save your selection.  
 7) When the trapezoid is adjusted, press the button to highlight PARALLELOGRAM or press the button to return to the ADJUST SHAPE window.



- 8) To adjust the PARALLELOGRAM, press the or button.  
 9) When the parallelogram is adjusted, press the button to return to the ADJUST SHAPE window. BACK TO MAIN CONTROLS window will be highlighted.  
 10) Press the button to return to the MAIN CONTROLS window, or press the button until ROTATE IMAGE is highlighted.

Smart Help After returning to MAIN CONTROLS...

... To continue to ROTATE IMAGE, start with step 5 under ROTATE IMAGE and follow the directions.

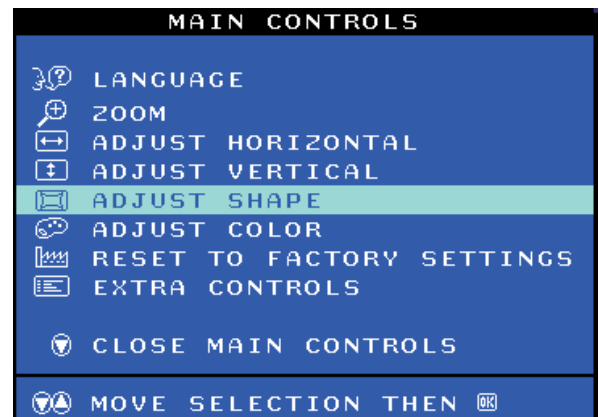
...To exit a completely, press the button twice.

...To adjust only the PARALLELOGRAM, follow steps 1-4 above, then press the button, and follow steps 7-9

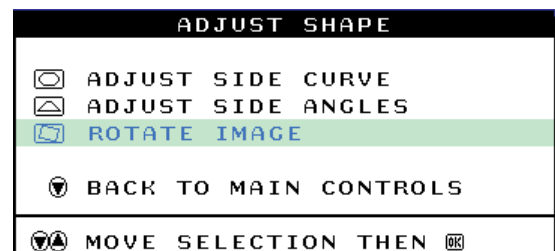
## ROTATE IMAGE

ROTATE IMAGE under ADJUST SHAPE allows you to adjust the rotated image. Note : use this feature only when the picture is not square.

- 1) Press the button on the monitor. The MAIN CONTROLS window appears.  
 2) Press the button until ADJUST SHAPE is highlighted.

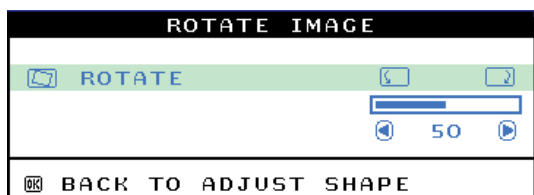


- 3) Press the button. The ADJUST SHAPE window appears. ADJUST SIDE CURVE should be highlighted.  
 4) Press the button until ROTATE IMAGE is highlighted.



- 5) Press the button. The ROTATE IMAGE window appears. ROTATE will be highlighted.  
 6) To adjust the rotation, press the or button.

◀◀ Go to cover page



7) When the rotation is adjusted, press the **OK** button to return to the ADJUST SHAPE window. BACK TO MAIN CONTROLS should be highlighted.

8) Press the **OK** button to return to MAIN CONTROLS.

Smart Help After returning to MAIN CONTROLS...

... To continue to ADJUST COLOR, press the **Left** button until ADJUST COLOR is highlighted. Next, start with step 3 under ADJUST COLOR and follow the directions.

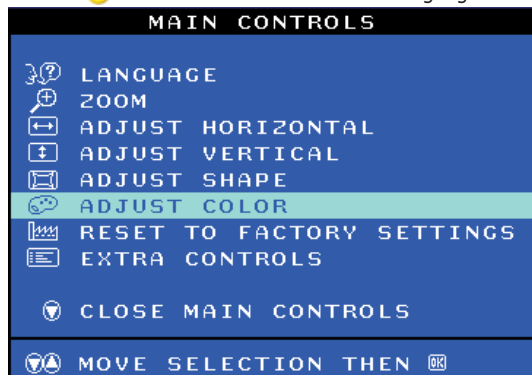
... To exit completely, press the **OK** button twice.

#### ADJUST COLOR

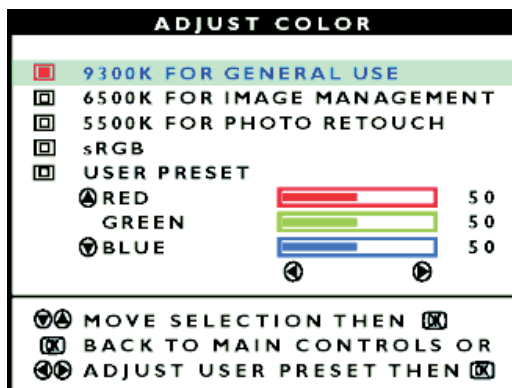
Your monitor has two preset options you can choose from. The first option is for GENERAL USE, which is fine for most applications. The second option is for GAMES, which is for playing computer games. When you select one of these options, the monitor automatically adjusts itself to that option. There is also a third option, USER PRESET, which allows you to adjust the colors on your screen to a setting you desire.

1) Press the **OK** button on the monitor. The MAIN CONTROLS window appears.

2) Press the **Left** button until ADJUST COLOR is highlighted.

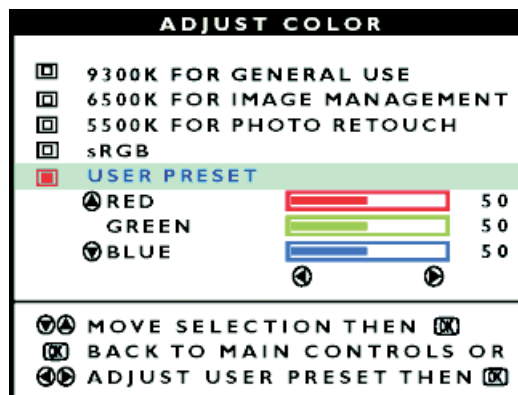


3) Press the **OK** button. The ADJUST COLOR window appears.



4) Press the **Left** or **Right** button to highlight 9300K for GENERAL USE. 6500K for GAMES, or USER PRESET.

5) Once you have highlighted the GENERAL USE OR GAMES, press the **OK** button to confirm your selection and return to the MAIN CONTROLS window. CLOSE MAIN CONTROLS will be highlighted.



6) If USER PRESET is highlighted, press the **Right** button to highlight RED(GREEN BLUE). Next, press the **Left** or **Right** button to adjust the color red(green blue).

7) When all adjustments are complete, press the **Right** button until RESET TO FACTORY SETTINGS is highlighted. Next, start with step 3 under RESET TO FACTORY SETTINGS.  
...To exit completely, press the **OK** button.

#### RESET TO FACTORY SETTINGS

RESET TO FACTORY SETTINGS returns everything in all the windows to factory presets.

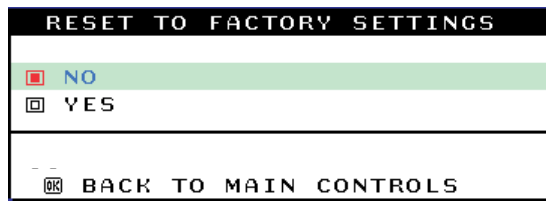
1) Press the **OK** button on the monitor. The MAIN CONTROLS window appears.

2) Press the **Left** button until RESET TO FACTORY SETTING is highlighted.



3) Press the **OK** button. The RESET TO FACTORY SETTINGS window appears.

4) Press the **Left** or **Right** button to select YES or NO. NO is the defaults. YES return all settings to their original factory adjustments.



- 5) Press the button to confirm your selection and return to the MAIN CONTROLS window. CLOSE MAIN CONTROLS will be highlighted.

Smart Help After returning to MAIN CONTROLS...

... To continue to EXTRA CONTROLS, press the button until EXTRA CONTROLS is highlighted. Next, start with step 3 under EXTRA CONTROLS.

...To exit completely, press the button.

## EXTRA CONTROLS

### ADJUST MOIRE

EXTRA CONTROLS is a set of three feature, including ADJUST MOIRE. Moire is a fringe pattern arising from the interference between two superimposed line patterns. To adjust your moire, follow the steps below. Note: use only if necessary. By activating ADJUST MOIRE, sharpness can be affected.

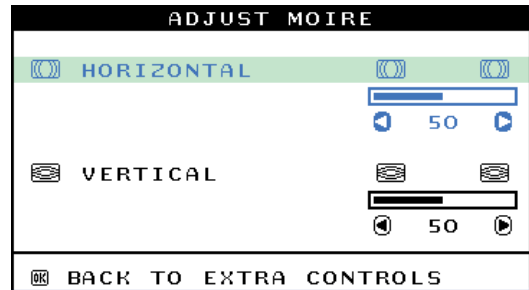
- 1) Press the button on the monitor. The MAIN CONTROLS window appears.
- 2) Press the button until EXTRA CONTROLS is highlighted.



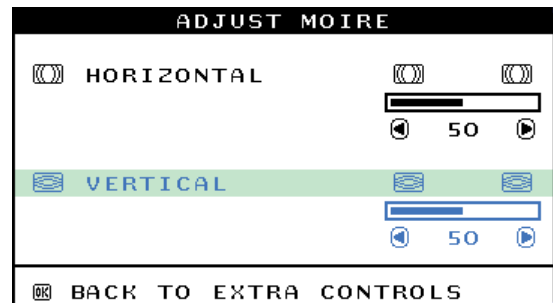
- 3) Press the button. The EXTRA CONTROLS window appears. ADJUST MOIRE will be highlighted.



- 4) Press the button. The ADJUST MOIRE window appears. HORIZONTAL will be highlighted.



- 5) To adjust the horizontal moire, press the or button.
- 6) When the horizontal moire is adjusted, press the button to highlight VERTICAL.



- 7) To adjust the vertical moire, press the or button.
- 8) When the vertical moire is adjusted, press the button to return to the EXTRA CONTROLS window. BACK TO MAIN CONTROLS will be highlighted.

Smart Help After returning to MAIN CONTROLS...

... To continue to DEGAUSS, press the button until DEGAUSS is highlighted. Next, start with step 3 under EXTRA CONTROLS, DEGAUSS.

...To exit completely, press the button.

### DEGAUSS

EXTRA CONTROLS is a set of three feature, including DEGAUSS. Degaussing remove electromagnetic build up that may distort the color on your screen.

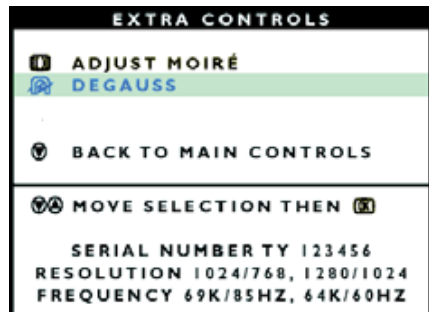
- 1) Press the button on the monitor. The MAIN CONTROLS window appears.
- 2) Press the button until EXTRA CONTROLS is highlighted.

# OSD Adjustments (Continued)

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- 3) Press the button. The EXTRA CONTROLS window appears. ADJUST MOIRE will be highlighted.
- 4) Press the button until DEGAUSS is highlighted.



- 5) To degauss your screen, press the button. Your screen will be degaussed, then the MAIN CONTROLS will reappear. CLOSE MAIN CONTROLS will be highlighted.

Smart Help After returning to MAIN CONTROLS...  
...To exit completely, press the button.

CLOSE MAIN CONTROLS



## Monitor specific troubleshooting

### Self-test Feature Check(STFC)

Your monitor provides a self-test feature that allows you to check whether your monitor is functioning properly. If your monitor and computer are properly connected but the monitor screen remains dark, run the monitor self-test by performing the following steps:

1. Turn off both your computer and the monitor.
  2. Unplug the video cable from the back of the computer.
  3. Turn on the monitor.
- If the monitor is functioning properly, you will see a OSD message as shown in the following illustration:

CHECK SIGNAL CABLE

This box also appears during normal system operation if the video cable becomes disconnected or damaged. This box will remain on for one minute, go off five seconds. Then on for one minute, and will repeat cycle.

1. Turn off your monitor and reconnect the video cable: then turn on both your computer and the monitor.
2. While in self-test mode, the LED remains green and the pattern remains on and stationary.

If your monitor screen still remains dark after you use the previous procedure, check your video controller and computer system; your monitor is functioning properly.

### NO SIGNAL INPUT


If there is something wrong with the input signal, a message appears on the screen although the power indicator LED is still on. The message may indicate that the monitor is NO SIGNAL INPUT or that you need to check the signal cable.

NO SIGNAL INPUT

## OSD LOCK


OSD LOCK is a feature which disables the OSD controls. It can be used when the monitor is set up for demonstration purposes or when adjustment of the OSD is not desirable.

Switch on OSD LOCK feature:

Press and hold the  button continuously for 15 seconds. Release the button when the message "CONTROL MENU IS LOCKED" appears.







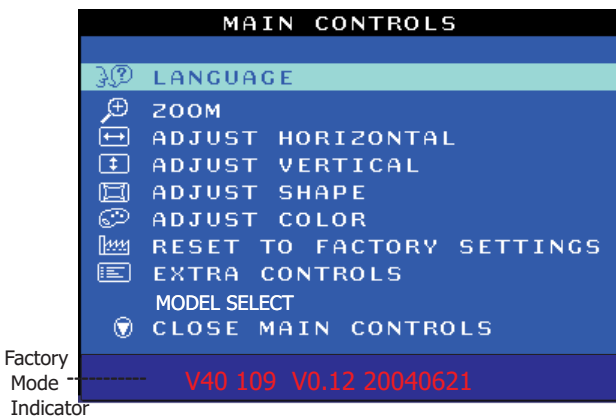
Switch off OSD lock feature:







Press and hold the  button continuously for 15 seconds or until the message window "CONTROL MENU IS LOCKED" disappears. And "MAIN CONTROLS" appears.



To access factory mode

1. Turn off monitor(don't turn off PC)
2. Press , , and  simultaneously on the front control pane, then press , wait until the OSD menu with characters V32 107T6 Vu.z4 20040303 (below OSD menu) come on the screen of monitor.






3. If OSD menu disappears on the screen of monitor, press  again(anytime), then the OSD menu comes on the screen again.
4. Using ,  : to select OSD menu.
5. Using ,  : to increase or decrease the setting.
6. Using  : to access/confirm the selection.

To leave factory mode

7. After alignment of factory mode, turn off monitor(if you do not run off monitor, the OSD menu is always at the factory mode), then turn on monitor again (at this moment, the OSD menu goes back to user mode.)

To access BURN IN mode

First of all, monitor displays an image.

1. Disconnect the video cable(interface cable).
2. Turn off monitor
3. Press , , and  simultaneously on the front control panel, then the BURN IN mode comes on the screen of monitor as below.

50 seconds around



5 second around



repeat

4. Reconnect the video cable, then return the normal image.

SERVICE MODE (indication-factory mode)



Default setting of MODEL SELECT

MODEL SELECT	
RESERVE	
<input type="checkbox"/> RESERVE	
RESERVE	
109B6 CPT	
109B6 LG	
109E6	
<input type="checkbox"/> SWDDC	
<input type="checkbox"/> LF ONOSD	
<input type="checkbox"/> Lf3	



# Mechanical Instructions

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## 0. General

To be able to perform measurements and repairs on the "circuit boards", this unit should be placed in the service position first.

## 1. Remove the rear cover in Fig. 1 and Fig. 2.

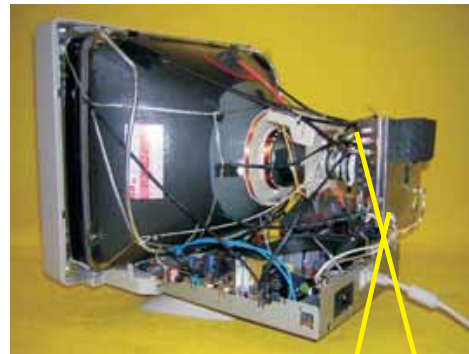
- Remove 4 screws as shown
- Remove back cover as shown
- Remove pedestal as shown

## 2. Video panel

- Disconnect the wire between metal shield of video panel and CRT neck as shown in Fig. 3.
- Disconnect the CRT grounding from Video panel.
- Remove screw grounding and grounding wire in Fig. 4.

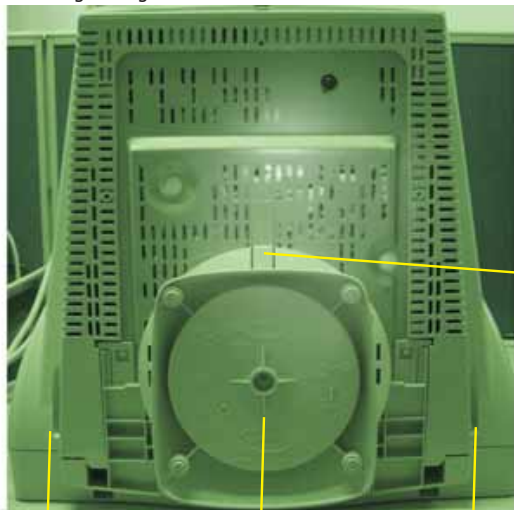
## 3. Main board connector in Fig. 5.

- Disconnect york wire
- Disconnect rotation connector
- Disconnect control board connector
- Remove Screw for fixed I/F cable
- Remove signal connector
- Remove degaussing wire connector



CRT grounding wire

Video Panel Fig. 3



Clip

Screw

Pedestal ass'y

Fig. 1

Screw



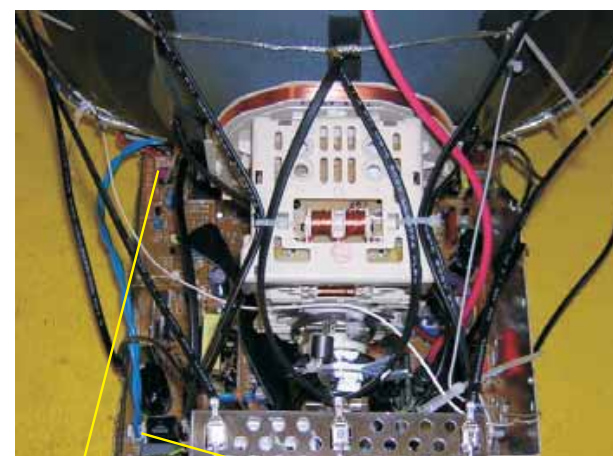
Screw

Fig. 2



Screw-grounding

Fig. 4



Control connector

Degaussing wire connector

Fig. 5



## 4. Main panel with Bottom Tray

- Remove the screws for disconnect the Bottom tray as Fig. 6.
- Open the click and remove the screws on the main board from fig. 6 to fig.7.

## 5. SERVICE POSITION

- reconnect connectors, some wires and panels (chassis), service position can be available for DC/AC measurement as shown in Fig.8 Fig. 9.

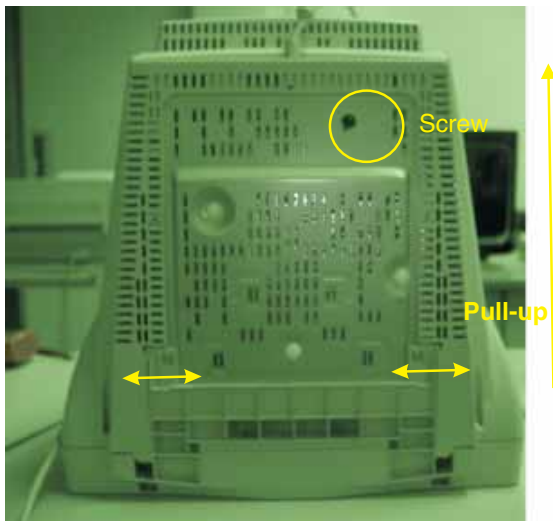


Fig. 6

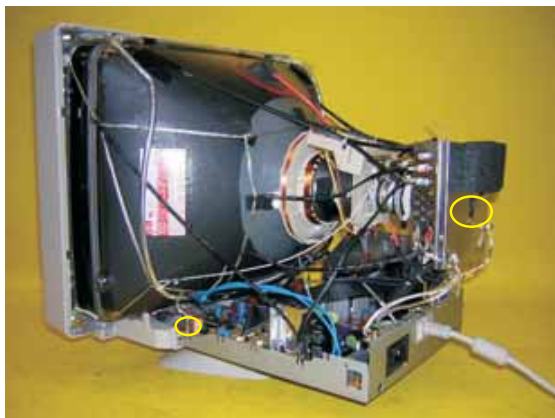


Fig.7

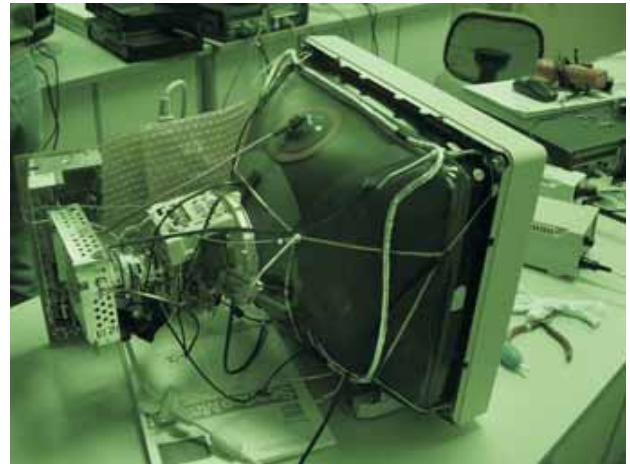


Fig. 8

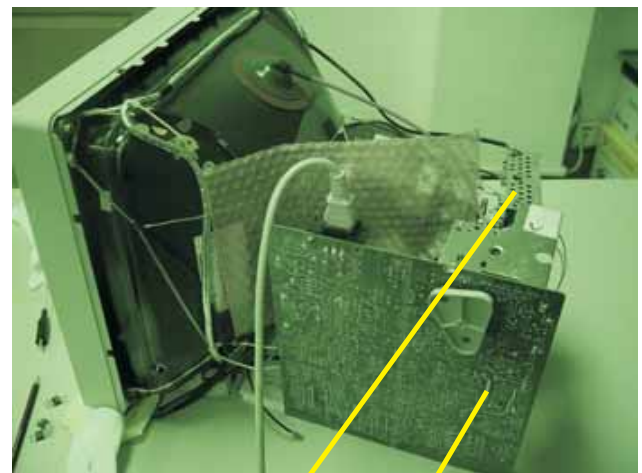


Fig.9

Video panel

Main panel

Fig. 9 SERVICE POSITION

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General

DDC Data Re-programming  
In case the DDC data memory IC or main EEPROM which storage all factory settings were replaced due to a defect, the serial numbers have to be re-programmed"Analog DDC IC, & EEPROM".  
It is advised to re-soldered DDC IC and main EEPROM from the old board onto the new board if circuit board have been replaced, in this case the DDC data does not need to be re-programmed.

Additional information  
Additional information about DDC (Display Data Channel) may be obtained from Video Electronics Standards Association (VESA). Extended Display Identification Data(EDID) information may be also obtained from VESA.

System and equipment requirements

- 1. An i486 (or above) personal computer or compatible.
- 2. Microsoft operation system Windows 95/98 .  
You have to Install the EDID\_PORT\_Tool under Win2000/XP . As Fig. 1 .

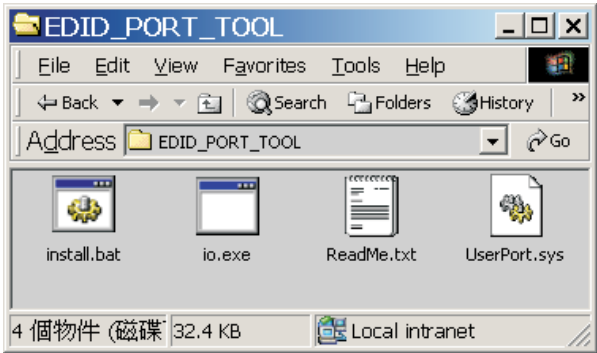


Fig. 1

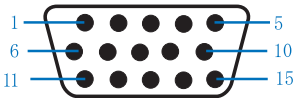
- A. Cody the "UserPort.sys" to C:\WINNT\system32\drivers(win2000)  
C:\WINDOWS\system32\drivers(winXP)
- B. Running " io.exe" everytime, Before you start to programming edid data .
- 3. EDID301.EXE program
- 4. A/D Alignment kits (12NC: 3138 106 10079) shown as Fig. 2:  
inclusion : a. Alignment box x1



Fig. 2

- b. Printer cable x1
- c. (D-Sub) to (D-Sub) cable x1

Note: The EDID301.EXE is a windows-based program, which cannot be run in MS-DOS.



Pin assignment

15-pin D-Sub Connector

PIN No.	SIGNAL
1	Red
2	Green
3	Blue
4	Sense (GND)
5	Self Test
6	Red GND
7	Green GND
8	Blue GND
9	Not connect
10	Sync GND
11	Sense (GND)
12	Bi-directional data(SDA)
13	H-sync
14	V-sync
15	DDC Data clock(SCL)

Configuration and procedure

There is no Hardware DDC (DDC IC) anymore. Main EEPROM stores all factory settings and DDC data (EDID code) which is also called Software DDC. The following section describes the connection and procedure for Software DDC application. The main EEPROM can be re-programmed by enabling " factory memory data write" function on the DDC program (EDID301.EXE).

Initialize alignment box

In order to avoid that monitor entering power saving mode due to sync will cut off by alignment box, it is necessary to initialize alignment box before running programming software (EDID301.EXE). Following steps show you the procedures and connection.

- Step 1: Supply 8-12V DC power source to the Alignment box by plugging a DC power cord .
- Step 2: Connecting printer cable and D-Sub cable of monitor as Fig. 3

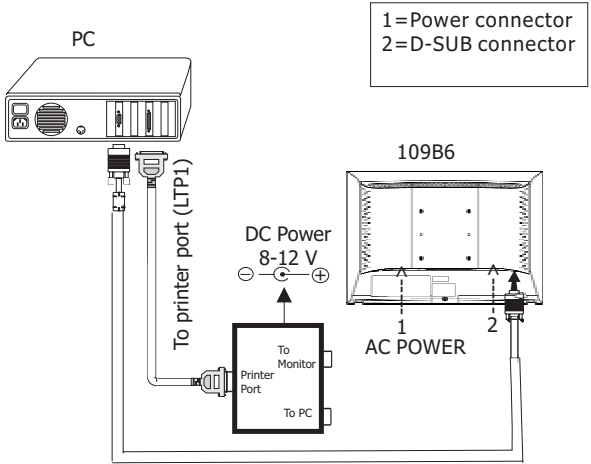



Fig. 3

## Step 3: Installation of EDID301.EXE

## Method 1: Start on DDC program

Start Microsoft Windows.

1. Copy the Program "EDID301.EXE" in service manual cd-rom to C:\.
2. Click , choose Run at start menu of Windows as shown in Fig. 4.

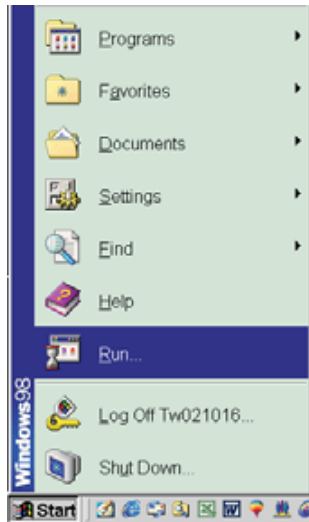


Fig. 4

3. At the submenu, type the letter of your computer's hard disk drive followed by :EDID301 (for example, C:\EDID301, as shown in Fig. 5).

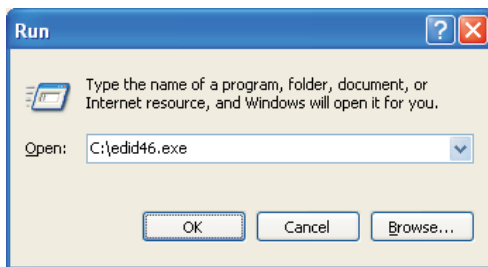


Fig. 5

4. Click OK button. The main menu appears (as shown in Fig. 6). This is for initialize alignment box.

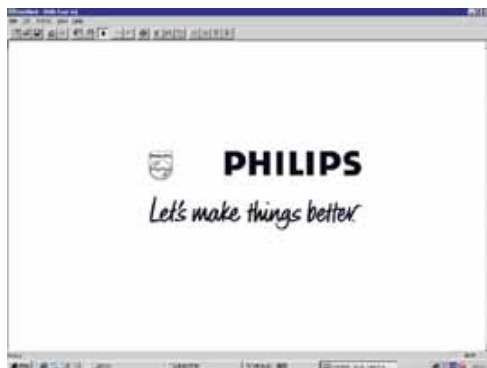


Fig. 6

Note 1: If the connection is improper, you will see the following error message (as shown in Fig. 7) before entering the main menu. Meanwhile, the (read EDID) function will be disabled. At this time, please make sure all cables are connected correctly and fixedly, and the procedure has been performed properly.



Fig. 7

Note 2: During the loading, EDID301 will verify the EDID data which just loaded from monitor before proceeding any further function, once the data structure of EDID can not be recognized, the following error message will appear on the screen as below. Please confirm following steps to avoid this message.

1. The data structure of EDID was incorrect.
2. DDC IC that you are trying to load data is empty.
3. Wrong communication channel has set at configuration setup windows.
4. Cables loosed or poor contact of connection.

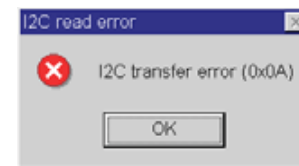


Fig. 8

## Re-programming EEPROM (Software DDC IC)

Step 1: After initialize alignment box, connecting all cables and box as shown in Fig. 9

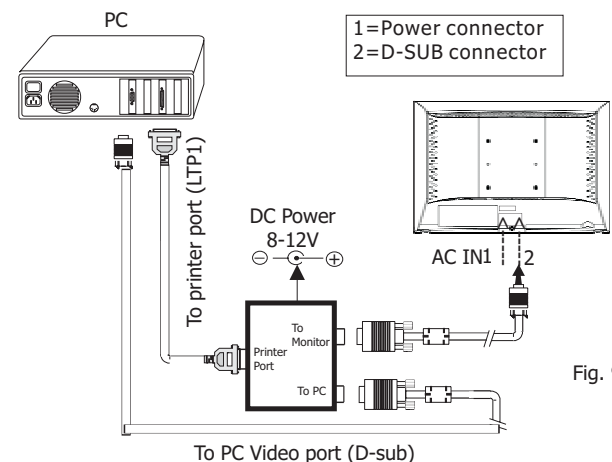


Fig. 9

Step 2: Read DDC data from monitor

1. Click  icon as shown in Fig. 10 from the tool bar to bring up the Channels "Configuration Setup" windows as shown in Fig. 11.



Fig. 10

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2. Select the DDC2B as the communication channel.

As shown in Fig. 11.

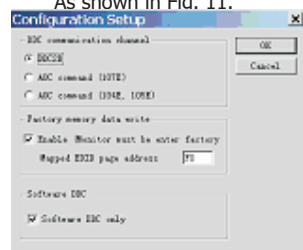


Fig. 11

3. Click OK button to confirm your selection.

4. Click  icon (Read EDID function) to read DDC EDID data from monitor. The EDID codes will display on screen as shown in Fig. 12.

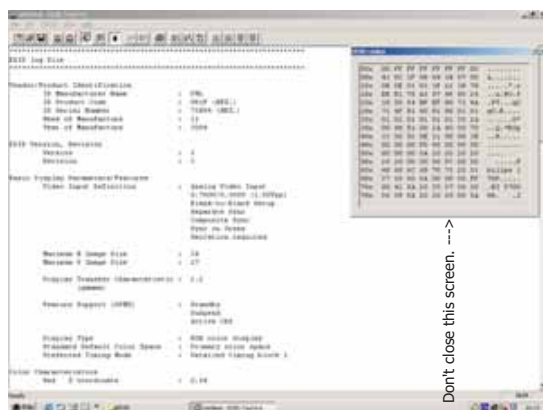


Fig. 12

Step 3: Modify DDC data (verify EDID version, week, year)


1. Click  (new function) icon from the tool bar, bring up Step 1 of 9 as shown in Fig. 13. EDID301 DDC application provides the function selection and text change (select & fill out) from Step 1 to Step 9.



Fig. 13

Step 4: Modify DDC data (Monitor Serial No.)

1. Click Next , bring up Fig. 14.



Fig. 14

2. Click Next , bring up Fig. 15.



Fig. 15

3. Click Next , bring up Fig. 16.

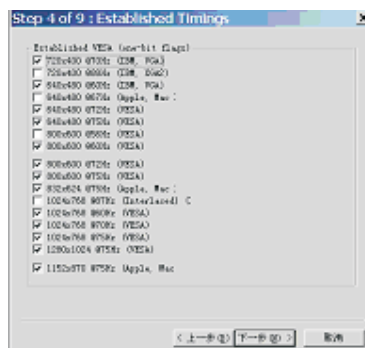


Fig. 16

4. Click Next , bring up Fig. 17.

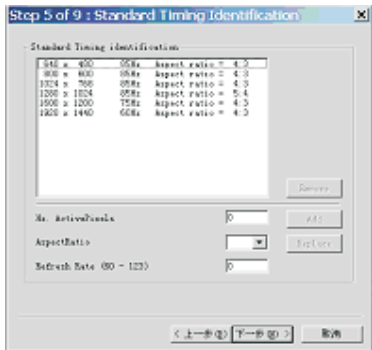


Fig. 17

7. Click Next , bring up Fig. 20.

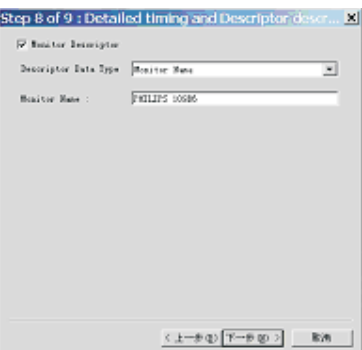


Fig. 20

5. Click Next , bring up Fig. 18.

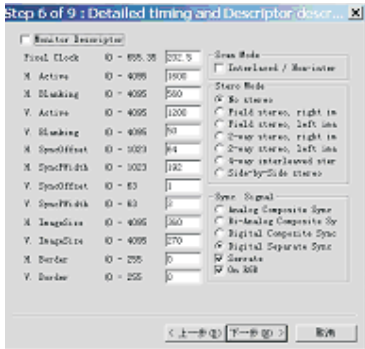


Fig. 18

8. Click Next , bring up Fig. 19.  
- Serial number can be filled up at this moment (for example, TY 000130).

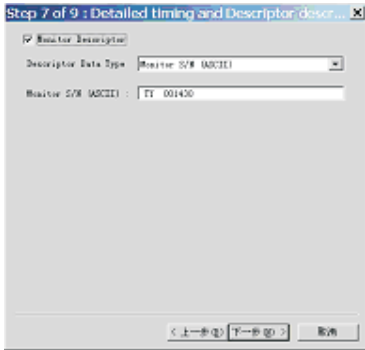


Fig. 19

8. Click Next , bring up Fig. 21.  
- Click Finish to exit the Step window.

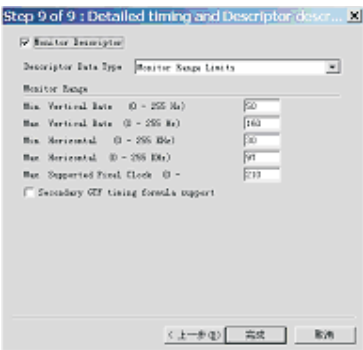


Fig. 21

Step 5: Write DDC data  
1. Configuration should be as Fig. 22. And press OK.

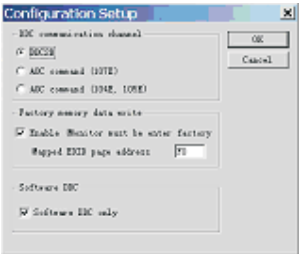


Fig. 22

◀◀ Go to cover page

## 2. Access Factory Mode







- 1). Turn off monitor.
- 2). [Push " - " & " + " buttons at the same time and hold it ] + [Press power " ⏻ " button untill comes out "Windows screen"] => then release all button, then press , wait until the OSD menu (below OSD menu) come on the Screen of the monitor (see Fig. 23).

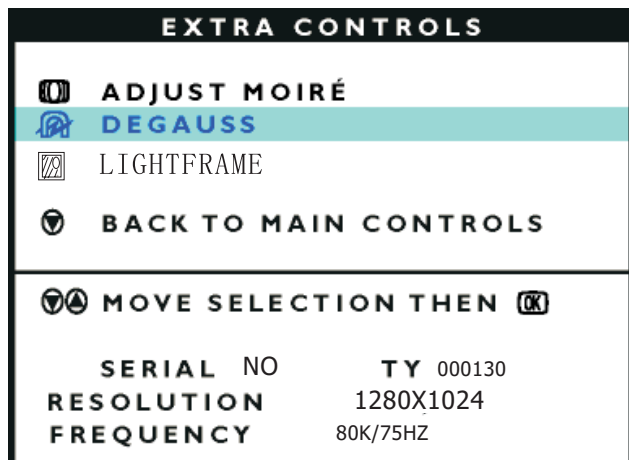


Fig. 23

3. Click  (Write EDID) icon from the tool bar to write DDC data.


## 4. Confirm Serial Number in User Mode

- 1) Press the  button to turn off the monitor. Press the  button again to turn on the monitor.
- 2) Press the  button to bring up the OSD main menu.
- 3) Press the  button to select Extra Controls, press the  button to confirm your selection.
- 4) Confirm the Serial Number "TY 000130" is updated as shown in Fig. 25.



## Step 6: Save DDC data

Sometimes, you may need to save DDC data as a text file for using in other IC chip. To save DDC data, follow the steps below:

1. Click  (Save) icon (or click "file"-> "save as") from the tool bar And give a file name as shown in Fig. 25. The file type is EDID46 file (\*.ddc) which can be open in WordPad. By using WordPad, the texts of DDC data & table (128 bytes, hex code) can be modified. If DDC TEXTS & HEX Table are completely correct, it can be saved as .ddc file to re-load it into DDC IC for DDC Data application.

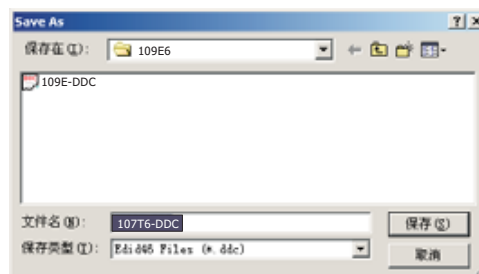


Fig. 25

2. Click Save.

## Step 7: Exit DDC program

Pull down the File menu and select Exit as shown in Fig. 26.

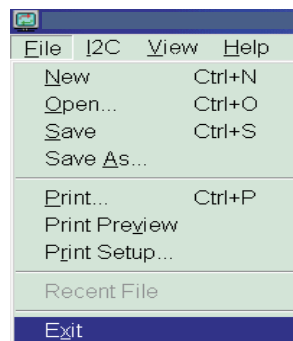


Fig. 26



\*\*\*\*\*  
 EDID log file LG TUBE  
 \*\*\*\*\*

## Vendor/Product Identification

ID Manufacturer Name : PHL  
 ID Product Code : E01E (HEX.)  
 ID Serial Number : 12345 (DEC.)  
 Week of Manufacture : 38  
 Year of Manufacture : 2004

## EDID Version, Revision

Version : 1  
 Revision : 3

## Basic Display Parameters/Features

Video Input Definition : Analog Video Input  
 0.700V/0.000V (0.70Vpp)  
 without Blank-to-Black Setup  
 Separate Sync  
 without Composite Sync  
 without Sync on Green  
 no Serration required  
 Maximum H Image Size : 36  
 Maximum V Image Size : 27  
 Display Transfer Characteristic  
 (gamma) : 2.96  
 Feature Support (DPMS) : Standby  
 Suspend  
 Active Off  
 Display Type : RGB color display  
 Standard Default Color Space : Primary color space  
 Preferred Timing Mode : Detailed timing block 1

## Color Characteristics

Red X coordinate : 0.625  
 Red Y coordinate : 0.336  
 Green X coordinate : 0.29  
 Green Y coordinate : 0.599  
 Blue X coordinate : 0.149  
 Blue Y coordinate : 0.073  
 White X coordinate : 0.283  
 White Y coordinate : 0.297

## Established Timings

Established Timings I : 720 x 400 @70Hz (IBM,VGA)  
 720 x 400 @88Hz (IBM,XGA2)  
 640 x 480 @60Hz (IBM,VGA)  
 640 x 480 @67Hz (Apple ,Mac )  
 640 x 480 @72Hz (VESA)  
 640 x 480 @75Hz (VESA)  
 800 x 600 @56Hz (VESA)  
 800 x 600 @60Hz (VESA)  
 Established Timings II : 800 x 600 @72Hz (VESA)  
 800 x 600 @75Hz (VESA)  
 832 x 624 @75Hz (Apple ,Mac II)  
 1024 x 768 @60Hz (VESA)  
 1024 x 768 @70Hz (VESA)  
 1024 x 768 @75Hz (VESA)  
 1280 x 1024 @75Hz (VESA)

Manufacturer's timings : 1152 x 870 @75Hz (Apple ,Mac II)

## Standard Timing Identification #1

Horizontal active pixels : 800  
 Aspect Ratio : 4:3  
 Refresh Rate : 85

## Standard Timing Identification #2

Horizontal active pixels : 1024  
 Aspect Ratio : 4:3  
 Refresh Rate : 85

## Standard Timing Identification #3

Horizontal active pixels : 1280  
 Aspect Ratio : 5:4  
 Refresh Rate : 85

## Standard Timing Identification #4

Horizontal active pixels : 1920  
 Aspect Ratio : 4:3  
 Refresh Rate : 60

## Standard Timing Identification #5

Horizontal active pixels : 1600  
 Aspect Ratio : 4:3  
 Refresh Rate : 60

## Standard Timing Identification #6

Horizontal active pixels : 1600  
 Aspect Ratio : 4:3  
 Refresh Rate : 65

## Standard Timing Identification #7

Horizontal active pixels : 1280  
 Aspect Ratio : 4:3  
 Refresh Rate : 85

## Standard Timing Identification #8

Horizontal active pixels : 1600  
 Aspect Ratio : 4:3  
 Refresh Rate : 70

## Detailed Timing #1

Pixel Clock (MHz) : 202  
 H Active (pixels) : 1600  
 H Blanking (pixels) : 560  
 V Active (lines) : 1200  
 V Blanking (lines) : 50  
 H Sync Offset (F Porch) (pixels) : 64  
 H Sync Pulse Width (pixels) : 192  
 V Sync Offset (F Porch) (lines) : 1  
 V Sync Pulse Width (lines) : 3  
 H Image Size (mm) : 360  
 V Image Size (mm) : 270  
 H Border (pixels) : 0  
 V Border (lines) : 0  
 Flags : Non -interlaced  
 : Normal Display, No stereo  
 : Digital Separate sync.  
 : Positive Vertical Sync.  
 : Positive Horizontal Sync.

## Monitor Descriptor #2

Serial Number : TY 123456

## Monitor Descriptor #3

Monitor Name : PHILIPS 109B6

## Monitor Descriptor #4

Monitor Range Limits  
 Min. Vt rate Hz : 50  
 Max. Vt rate Hz : 160  
 Min. Horiz. rate kHz : 30  
 Max. Horiz. rate kHz : 97  
 Max. Supported Pixel : 230  
 No secondary GTF timing formula supported.

## Extension Flag

: 0

## Check sum

: 41 (HEX.)

\*\*\*\*\*

## EDID data (128 bytes) LG TUBE

\*\*\*\*\*

0: 00 1: ff 2: ff 3: ff 4: ff 5: ff 6: ff 7: 00  
 8: 41 9: 0c 10: 1e 11: e0 12: 39 13: 30 14: 00 15: 00  
 16: 26 17: 0e 18: 01 19: 03 20: 68 21: 24 22: 1b 23: c4  
 24: ef 25: 05 26: 78 27: a0 28: 56 29: 4a 30: 99 31: 26  
 32: 12 33: 48 34: 4c 35: ff 36: ef 37: 80 38: 45 39: 59  
 40: 61 41: 59 42: 81 43: 99 44: d1 45: 40 46: a9 47: 40  
 48: a9 49: 45 50: 81 51: 59 52: a9 53: 4f 54: e8 55: 4e  
 56: 40 57: 30 58: 62 59: b0 60: 32 61: 40 62: 40 63: c0  
 64: 13 65: 00 66: 68 67: 0e 68: 11 69: 00 70: 00 71: 1e  
 72: 00 73: 00 74: 00 75: ff 76: 00 77: 20 78: 54 79: 59  
 80: 20 81: 20 82: 31 83: 32 84: 33 85: 34 86: 35 87: 36  
 88: 0a 89: 20 90: 00 91: 00 92: 00 93: fc 94: 00 95: 50  
 96: 48 97: 49 98: 4c 99: 49 100: 50 101: 53 102: 20 103: 31  
 104: 30 105: 39 106: 42 107: 36 108: 00 109: 00 110: 00 111: fd  
 112: 00 113: 32 114: a0 115: 1e 116: 61 117: 17 118: 00 119: 0a  
 120: 20 121: 20 122: 20 123: 20 124: 20 125: 20 126: 00 127: 41

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# EDID log file SDI TUBE

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## Vendor/Product Identification

ID Manufacturer Name : PHL  
ID Product Code : E01E (HEX.)  
ID Serial Number : 12345 (DEC.)  
Week of Manufacture : 38  
Year of Manufacture : 2004

## EDID Version, Revision

Version : 1  
Revision : 3

## Basic Display Parameters/Features

Video Input Definition : Analog Video Input  
0.700V/0.000V (0.70Vpp)  
without Blank-to-Black Setup  
Separate Sync  
without Composite Sync  
without Sync on Green  
no Serration required

Maximum H Image Size : 36  
Maximum V Image Size : 27  
Display Transfer Characteristic : 2.9  
(gamma)

Feature Support (DPMS) : Standby  
Suspend  
Active Off

Display Type : RGB color display  
Standard Default Color Space : Primary color space  
Preferred Timing Mode : Detailed timing block 1

## Color Characteristics

Red X coordinate : 0.639  
Red Y coordinate : 0.323  
Green X coordinate : 0.275  
Green Y coordinate : 0.597  
Blue X coordinate : 0.143  
Blue Y coordinate : 0.062  
White X coordinate : 0.283  
White Y coordinate : 0.297

## Established Timings

Established Timings I : 720 x 400 @70Hz (IBM,VGA)  
720 x 400 @88Hz (IBM,XGA2)  
640 x 480 @60Hz (IBM,VGA)  
640 x 480 @67Hz (Apple ,Mac II)  
640 x 480 @72Hz (VESA)  
640 x 480 @75Hz (VESA)  
800 x 600 @56Hz (VESA)  
800 x 600 @60Hz (VESA)  
Established Timings II : 800 x 600 @72Hz (VESA)  
800 x 600 @75Hz (VESA)  
832 x 624 @75Hz (Apple ,Mac II)  
1024 x 768 @60Hz (VESA)  
1024 x 768 @70Hz (VESA)  
1024 x 768 @75Hz (VESA)  
1280 x 1024 @75Hz (VESA)

Manufacturer's timings : 1152 x 870 @75Hz (Apple,Mac II)

## Standard Timing Identification #1

Horizontal active pixels : 800  
Aspect Ratio : 4:3  
Refresh Rate : 85

## Standard Timing Identification #2

Horizontal active pixels : 1024  
Aspect Ratio : 4:3

Refresh Rate : 85

## Standard Timing Identification #3

Horizontal active pixels : 1280  
Aspect Ratio : 5:4  
Refresh Rate : 85

## Standard Timing Identification #4

Horizontal active pixels : 1920  
Aspect Ratio : 4:3  
Refresh Rate : 60

## Standard Timing Identification #5

Horizontal active pixels : 1600  
Aspect Ratio : 4:3  
Refresh Rate : 60

## Standard Timing Identification #6

Horizontal active pixels : 1600  
Aspect Ratio : 4:3  
Refresh Rate : 65

## Standard Timing Identification #7

Horizontal active pixels : 1280  
Aspect Ratio : 4:3  
Refresh Rate : 85

## Standard Timing Identification #8

Horizontal active pixels : 1600  
Aspect Ratio : 4:3  
Refresh Rate : 70

## Detailed Timing #1

Pixel Clock (MHz) : 202  
H Active (pixels) : 1600  
H Blanking (pixels) : 560  
V Active (lines) : 1200  
V Blanking (lines) : 50  
H Sync Offset (F Porch) (pixels) : 64  
H Sync Pulse Width (pixels) : 192  
V Sync Offset (F Porch) (lines) : 1  
V Sync Pulse Width (lines) : 3  
H Image Size (mm) : 360  
V Image Size (mm) : 270  
H Border (pixels) : 0  
V Border (lines) : 0  
Flags : Non -interlaced  
: Normal Display, No stereo  
: Digital Separate sync.  
: Positive Vertical Sync.  
: Positive Horizontal Sync.

## Monitor Descriptor #2

Serial Number : TY 123456

## Monitor Descriptor #3

Monitor Name : PHILIPS 109B6

## Monitor Descriptor #4

Monitor Range Limits  
Min. Vt rate Hz : 50  
Max. Vt rate Hz : 160  
Min. Horiz. rate kHz : 30  
Max. Horiz. rate kHz : 97  
Max. Supported Pixel : 230  
No secondary GTF timing formula supported.

## Extension Flag

: 0

## Check sum

: 5C (HEX.)

\*\*\*\*\*

## EDID data (128 bytes) SDI TUBE

\*\*\*\*\*

0: 00 1: ff 2: ff 3: ff 4: ff 5: ff 6: ff 7: 00  
8: 41 9: 0c 10: 1e 11: e0 12: 39 13: 30 14: 00 15: 00  
16: 26 17: 0e 18: 01 19: 03 20: 68 21: 24 22: 1b 23: be  
24: ef 25: bb 26: b8 27: a3 28: 52 29: 46 3: 0: 98 31: 24  
32: 0f 33: 48 34: 4c 35: ff 36: ef 37: 80 38: 45 39: 59  
40: 61 41: 59 42: 81 43: 99 44: d1 45: 40 46: a9 47: 40  
48: a9 49: 45 50: 81 51: 59 52: a9 53: 4f 54: e8 55: 4e  
56: 0a 57: 30 58: 62 59: b0 60: 32 61: 40 6: 2: 40 63: c0  
64: 13 65: 00 66: 68 67: 0e 68: 11 69: 00 70: 00 71: 1e  
72: 00 73: 00 74: 00 75: ff 76: 00 77: 20 78: 54 79: 59  
80: 20 81: 20 82: 31 83: 32 84: 33 85: 34 86: 35 87: 36  
88: 0a 89: 20 90: 00 91: 00 92: 00 93: fc 94: 00 95: 50  
96: 48 97: 49 98: 4c 99: 49 100: 50 101: 53 102: 20 103: 31  
104: 30 105: 39 106: 42 107: 36 108: 00 109: 00 110: 00 111: fd  
112: 00 113: 32 114: a0 115: 1e 116: 61 117: 17 118: 00 119: 0a  
120: 20 121: 20 122: 20 123: 20 124: 20 125: 20 126: 00 127: 5c

\*\*\*\*\*

## EDID log file CPT TUBE

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## Vendor/Product Identification

ID Manufacturer Name : PHL  
 ID Product Code : E01E (HEX.)  
 ID Serial Number : 12345 (DEC.)  
 Week of Manufacture : 38  
 Year of Manufacture : 2004

## EDID Version, Revision

Version : 1  
 Revision : 3

## Basic Display Parameters/Features

Video Input Definition : Analog Video Input  
 0.700V/0.000V (0.70Vpp)  
 without Blank-to-Black Setup  
 Separate Sync  
 without Composite Sync  
 without Sync on Green  
 no Serration required

Maximum H Image Size : 36  
 Maximum V Image Size : 27  
 Display Transfer Characteristic : 2.96 (gamma)  
 Feature Support (DPMS) : Standby  
 Suspend  
 Active Off

Display Type : RGB color display  
 Standard Default Color Space : Primary color space  
 Preferred Timing Mode : Detailed timing block 1

## Color Characteristics

Red X coordinate : 0.631  
 Red Y coordinate : 0.329  
 Green X coordinate : 0.276  
 Green Y coordinate : 0.6  
 Blue X coordinate : 0.143  
 Blue Y coordinate : 0.057  
 White X coordinate : 0.283  
 White Y coordinate : 0.297

## Established Timings

Established Timings I : 720 x 400 @70Hz (IBM,VGA)  
 720 x 400 @88Hz (IBM,XGA2)  
 640 x 480 @60Hz (IBM,VGA)  
 640 x 480 @67Hz (Apple ,Mac II)  
 640 x 480 @72Hz (VESA)  
 640 x 480 @75Hz (VESA)  
 800 x 600 @56Hz (VESA)  
 800 x 600 @60Hz (VESA)

Established Timings II : 800 x 600 @72Hz (VESA)  
 800 x 600 @75Hz (VESA)  
 832 x 624 @75Hz (Apple ,Mac II)  
 1024 x 768 @60Hz (VESA)  
 1024 x 768 @70Hz (VESA)  
 1024 x 768 @75Hz (VESA)  
 1280 x 1024 @75Hz (VESA)

Manufacturer's timings : 1152 x 870 @75Hz (Apple ,Mac II)

## Standard Timing Identification #1

Horizontal active pixels : 800  
 Aspect Ratio : 4:3  
 Refresh Rate : 85

## Standard Timing Identification #2

Horizontal active pixels : 1024  
 Aspect Ratio : 4:3  
 Refresh Rate : 85

## Standard Timing Identification #3

Horizontal active pixels : 1280  
 Aspect Ratio : 5:4  
 Refresh Rate : 85

## Standard Timing Identification #4

Horizontal active pixels : 1920  
 Aspect Ratio : 4:3  
 Refresh Rate : 60

## Standard Timing Identification #5

Horizontal active pixels : 1600  
 Aspect Ratio : 4:3  
 Refresh Rate : 60

## Standard Timing Identification #6

Horizontal active pixels : 1600  
 Aspect Ratio : 4:3  
 Refresh Rate : 65

## Standard Timing Identification #7

Horizontal active pixels : 1280  
 Aspect Ratio : 4:3  
 Refresh Rate : 85

## Standard Timing Identification #8

Horizontal active pixels : 1600  
 Aspect Ratio : 4:3  
 Refresh Rate : 70

## Detailed Timing #1

Pixel Clock (MHz) : 202  
 H Active (pixels) : 1600  
 H Blanking (pixels) : 560  
 V Active (lines) : 1200  
 V Blanking (lines) : 50  
 H Sync Offset (F Porch) (pixels) : 64  
 H Sync Pulse Width (pixels) : 192  
 V Sync Offset (F Porch) (lines) : 1  
 V Sync Pulse Width (lines) : 3  
 H Image Size (mm) : 360  
 V Image Size (mm) : 270  
 H Border (pixels) : 0  
 V Border (lines) : 0  
 Flags : Non -interlaced  
 : Normal Display, No stereo  
 : Digital Separate sync.  
 : Positive Vertical Sync.  
 : Positive Horizontal Sync.

## Monitor Descriptor #2

Serial Number : TY 123456

## Monitor Descriptor #3

Monitor Name : PHILIPS 109B6

## Monitor Descriptor #4

Monitor Range Limits  
 Min. Vt rate Hz : 50  
 Max. Vt rate Hz : 160  
 Min. Horiz. rate kHz : 30  
 Max. Horiz. rate kHz : 97  
 Max. Supported Pixel : 230  
 No secondary GTF timing formula supported.

Extension Flag : 0

Check sum : 88 (HEX.)

\*\*\*\*\*

## EDID data (128 bytes) CPT TUBE

\*\*\*\*\*

0: 00 1: ff 2: ff 3: ff 4: ff 5: ff 6: ff 7: 00  
 8: 41 9: 0c 10: 1e 11: e0 12: 39 13: 30 14: 00 15: 00  
 16: 26 17: 0e 18: 01 19: 03 20: 68 21: 24 22: 1b 23: c4  
 24: ef 25: 9e 26: a8 27: a1 28: 54 29: 46 30: 99 31: 24  
 32: 0e 33: 48 34: 4c 35: ff 36: ef 37: 80 38: 45 39: 59  
 40: 61 41: 59 42: 81 43: 99 44: d1 45: 40 46: a9 47: 40  
 48: a9 49: 45 50: 01 51: 59 52: a9 53: 4a 54: e8 55: 4e  
 56: 40 57: 30 58: 62 59: b0 60: 32 61: 40 62: 40 63: c0  
 64: 13 65: 00 66: 68 67: 0e 68: 11 69: 00 70: 00 71: 1e  
 72: 00 73: 00 74: 00 75: ff 76: 00 77: 20 78: 54 79: 59  
 80: 20 81: 20 82: 31 83: 32 84: 33 85: 34 86: 35 87: 36  
 88: 0a 89: 20 90: 00 91: 00 92: 00 93: fc 94: 00 95: 50  
 96: 48 97: 49 98: 4c 99: 49 100: 50 101: 53 102: 20 103: 31  
 104: 30 105: 39 106: 42 107: 36 108: 00 109: 00 110: 00 111: fd  
 112: 00 113: 32 114: a0 115: 1e 116: 61 117: 17 118: 00 119: 0a  
 120: 20 121: 20 122: 20 123: 20 124: 20 125: 20 126: 00 127: 88

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## Introduction

Philips LightFrame™ feature enriches the experience of pictures and video on a Philips CRT (picture tube) monitor. LightFrame™ will boost the brightness and sharpness of photos and videos on the monitor screen.

To control the LightFrame□ feature in your monitor, you have to install the LightFrame™ application which you will find on this CD-ROM.

## Note

Philips LightFrame™ will only work with monitors that have been built to use this software. Earlier Philips monitors or other manufacturers' monitors will not work with this special software. It is recommended that you install this software only on a Philips monitor designed to use it. These monitors can be identified by the LightFrame™ logo on the front of the monitor.

This software is not designed for use with LCD flat screen monitors.

LightFrame™ will work with true Windows-based programs and DOS-based programs that operate in a Windows environment. It will not work with DOS-based programs operating only in a DOS environment.

## Language Selection

While English is the default language of LightFrame™, the User Interface can be set up to operate in Dutch, French, German, Italian, Portuguese, Spanish, Simplified Chinese, Traditional Chinese or Korean.

## Installation

- 1) To install LightFrame™, place the CD in the CD-ROM drive.
- 2) Next, when the menu of items on the CD appears on your screen, click on 'Install LightFrame™'.
- 3) Now, follow the on-screen prompts to properly install the program. The software checks to see if you have a compatible monitor. You must agree to the license agreement terms for the software to install.
- 4) After installation, LightFrame™ automatically loads and the icon appears in the taskbar.

## Notes

If LightFrame™ detects that your monitor is not LightFrame™ compatible, a message appears on the monitor screen. If you see this message, you can select to abort or continue the installation. However, if you continue the installation, LightFrame™ will probably not work on the monitor.

## How to use LightFrame™

After installation, LightFrame™ starts up automatically whenever the computer is started.

For information about using LightFrame™ please refer to the help information which is available after installation.

## Compatibility

This version of LightFrame™ is compatible with

Windows 95

Windows 98

Windows Me (Millennium Edition)

Windows XP

Windows 2000 Professional Edition.

1. General point
- 1.1 During alignment and measurement supply a distortion free AC mains voltage to the apparatus via an isolating transformer with a low internal resistance.
- 1.2 All voltages have to be measured or applied with respect to ground, unless otherwise stated. Note: Do not use heat-sink as ground.
- 1.3 The term Linear RGB is meant the 0.7Vpp video with separate sync. (TTL level). The pre-set timing formats from pattern generator "CHROMA- 2250" are shown in GENERAL PRODUCT SPECIFICATION
- 1.4 Any external voltage source should have low internal impedance.
- 1.5 The alignment has to be done in room temperature  $25 \pm 5^{\circ}\text{C}$ .
- 1.6 Digital control buttons for

## OSD MENU :

## Main Controls

- Language
    - .Chinese
    - .English ----- default item.
    - Espanol
    - Francais
    - Deutsch
    - Italiano
    - Portuguese
    - Korean
  - Zoom
    - Zoom
  - Adjust Horizontal
    - Position
    - .Size
  - Adjust Vertical
    - .Position
    - .Size
  - Adjust Shape
    - Adjust side curve
      - Pincushion
      - .Balanced
    - .Adjust side angles
      - Trapezoid
      - Parallelogram
    - Rotate image
      - .Rotate
  - Adjust Color
    - .9300K for general use
    - 6500K for image management
    - 5500K for photo-retouch
    - .SRGB
    - .User Preset
      - R, G, B
  - Reset to factory settings
    - .No
    - .yes
  - Extra controls
    - .Adjust Moire
      - .Horizontal
      - .Vertical
      - .Degauss
      - .Light-frame
      - .Serial No.
      - .Resolution
      - .Frequency
  - Model select (under factory mode)
    - CPT CRT: set 109B6 CPT "ON "
    - LPD & SDI CRT: set 109B6 LG & SDI "ON "
    - .SWDDC set "ON"
    - .LF ONOSD set "ON"
    - .LF3 set "ON "
  - Close main controls
2. Pre warm-up
    - 2.1 Align in pre-warmed condition at least 30 minutes during manufacturing.
  3. Main chassis alignment
    - 3.1 Power supply adjustment
      - 3.1.1 Set Vg2 manually (screen) to fully counterclockwise (zero beam current).
      - 3.1.2 Apply 80KHz/75Hz full black pattern.
      - 3.1.3 Monitor the following auxiliary voltages.
        - +197.0V SOURCE ACROSS C2152 and gnd.  $+196.0\text{V} \pm 3.0\text{VDC}$
        - + 82.5V SOURCE ACROSS C2151  $+ 82.5\text{V} \pm 1.5\text{VDC}$
        - + 6.2V SOURCE ACROSS C2155  $+ 6.2\text{V} \pm 0.2\text{VDC}$
        - + 12.2V SOURCE ACROSS C2153  $+ 12.2\text{V} \pm 0.7\text{VDC}$
        - 12.2V SOURCE ACROSS C2154  $- 12.2\text{V} \pm 0.7\text{VDC}$
    - 3.2 H-Deflection supply voltage adjustment
      - 3.2.1 Apply 80KHz /75Hz 1280 x 1024 full black pattern.
      - 3.2.2 Adjust manually R3561 to obtain :
        - 146V +/- 0.3V for LPD , CPT & SDI CRT
        - across C2600 at zero beam current.
    - 3.3 Picture geometry and EHT regulation adjustment
      - 3.3.1 EHT regulation adjustment
        - At 1280 x 1024 80KHz/75Hz mode full black pattern
        - use DC voltage meter to measure socket 1681 Pin 1. Adjust VR 3699 to get 4.75V +/- 0.05V at socket 1681 pin 1.
  4. General conditions for alignment
    - 4.1 During all alignments, supply a distortion free AC mains voltage to set via an isolating transformer with low internal impedance.
    - 4.2 All measurements are carried out at nominal mains voltage, unless otherwise stated.
    - 4.3 Align in pre-warmed condition, at least 30 minutes warm-up with nominal light output.
    - 4.4 Purity, geometry and subsequent alignments should be carried out in magnetic cage with correct magnetic field.
      - Northern hemisphere :  $H = 0, V = 430 \pm 50\text{ Mg}, Z = 0$
      - Southern hemisphere :  $H = 0, V = -520 \pm 50\text{ Mg}, Z = 0$
    - 4.5 All voltages are to be measured or applied with respect to ground, unless otherwise stated. Attention: Do not use heat-sink as ground.
    - 4.6 Any external voltage sources should have a low internal impedance.
    - 4.7 Adjust function controls to center position unless otherwise stated.
    - 4.8 The white balance and purity has to be adjusted in dully lighted room.
    - 4.9 All alignments have to be done in a room with a temperature of  $25 \pm 10^{\circ}\text{C}$ .
  5. Alignment of Vg2 cut-off point, white tracking
    - 5.1 Please pre-store EPROM datas as below Form 1. before PCB assembly .
      - Form 1 : EEROM preset data list of CRT deviation



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CRT TYPE	adjusted	LPD CRT M46QEF903X21(T)		CPT CRT M46AJS53X46(SMV)		SDI CRT M46QCK761X214(TCO/ DFT-M)	
Freq(KHZ)	mode	LIN H	Corner T B	LIN H	Corner T B	LIN H	Corner T B
< 33.24	31.5K/70hz (720x400)	255(def)	111(def) 96(def)	245(def)	100(def) 96(def)	212(def)	100(def) 96(def)
33.2-36.5	35.1K/56hz	230(fix)	114(fix) 87(fix)	188(fix)	107(fix) 83(fix)	160(def)	95(def) 74(def)
36.5-40.0	37.9K/85hz	210(fix)	114(fix) 74(fix)	180(fix)	107(fix) 90(fix)	156(def)	109(def) 90(def)
40.0-45.0	43.2K/85hz	192(def)	113(def) 85(def)	155(def)	113(def) 94(def)	145(def)	113(def) 94(def)
45.0-52.0	48.3K/60hz	160(def)	117(def) 99(def)	142(def)	112(def) 95(def)	106(def)	115(def) 94(def)
52.0-54.5	53.6K/85hz	135(def)	123(def) 99(def)	140(def)	108(def) 92(def)	110(def)	123(def) 99(def)
54.5-58.5	56.5K/70hz	135(def)	115(def) 102(def)	115(def)	101(def) 102(def)	120(def)	113(def) 96(def)
58.5-65.5	63.8K/70hz	133(def)	105(def) 86(def)	60K/ 75hz 64K/ 70hz	98 (def) 78 (def) 111(def) 97(def)	110(def)	116(def) 100(def)
65.5-70.0	68.6K/85hz	130(def)	104(def) 91(def)	60(def)	92(def) 88(def)	105(def)	104(def) 96(def)
70.0-74.0	72.5K/90hz	120(def)	101(def) 95(def)	68(def)	96(def) 92(def)	113(def)	101(def) 100(def)
74.0-82.5	79.9K/70hz	108(def)	90(def) 92(def)			100 (def)	93(def) 91(def)
74.0-86.15	79.9K/70hz			48(def)	87(def) 90(def)		
82.5-97.0	91.1K/85hz	80(def)	87(def) 96(def)			42 (def)	96(def) 92(def)
86.15-97.0	91.1K/85hz			35(def)	95(def) 94(def)		
V LINBAL			113 (def)		113 (def)		113(def)
LIN V			138 (def)		138 (def)		106(def)

Note : " def " means default value , \_ " fix " means fixed value.

Note : The CAA does not execute adjustment for those modes with fixed DAC value.

Form 1 : EEPROM preset data list of CRT deviation

CRT	all CRTs Moire V	LPD(M46QEF903X21(T))	CPT(M46AJS53X46(SMV))	SDI(M46QCK761X214(T CO/DFT-M))
Adjusted mode		H EHT -	H EHT -	H EHT -
1. @ 31.5K/70 720X400	25%	45 (default)	82 (default)	66 (default)
2. 31.5K/60 640X480	25%	45 (follow mode 1)	82 (follow mode 1)	66 (follow mode 1)
3. 31.5K/70 640X350	25%	45 (follow mode 1)	82 (follow mode 1)	66 (follow mode 1)
4. 35.1K/56 800X600	25%	40 (fixed)	62 (fixed)	55 (fixed)
5. 35.0K/67 640X480	25%	40 (follow mode 4)	62 (follow mode 4)	55 (follow mode 4)
6. 37.5K/75 640X480	30%	74 (fixed)	85 (fixed)	68 (fixed)
7. 37.8K/72 640X480	30%	74 (follow mode 6)	85 (follow mode 6)	68 (follow mode 6)
8. 37.8K/60 800X600	30%	74 (follow mode 6)	85 (follow mode 6)	68 (follow mode 6)
9. 37.9K/85 720X400	30%	74 (follow mode 6)	85 (follow mode 6)	68 (follow mode 6)
10. 37.8K/85 640X350	30%	74 (follow mode 6)	85 (follow mode 6)	68 (follow mode 6)
11. @ 43.2K/85 640X480	25%	86 (default)	90 (default)	80 (default)
12. 46.8K/75 800X600	25%	93 (follow mode 14)	92 (follow mode 14)	78 (follow mode 14)
13. 48.0K/72 800X600	25%	93 (follow mode 14)	92 (follow mode 14)	78 (follow mode 14)
14. @ 48.3K/60 1024X768	25%	93 (default)	92 (default)	78 (default)
15. 49.7K/75 832X624	25%	93 (follow mode 14)	92 (follow mode 14)	78 (follow mode 14)
16. 50.6K/100 640X480	25%	93 (follow mode 14)	92 (follow mode 14)	78 (follow mode 14)
17. @ 53.6K/85 800X600	25%	92 (default)	97 (default)	85 (default)
18. @ 56.4K/70 1024X768	25%	96 (default)	98 (default)	86 (default)
19. 60.0K/60 1280X960	30%	94 (follow mode 22)	97 (follow mode 20)	85 (follow mode 22)
20. 60.0K/75 1024X768	30%	94 (follow mode 22)	97 (fixed)	85 (follow mode 22)
21. 60.4K/90 800X600	30%	94 (follow mode 22)	97 (follow mode 20)	85 (follow mode 22)
22. @ 63.8K/70 1152X864	25%	94 (default)	95 (default)	85 (default)
23. 63.9K/60 1280X1024	25%	94 (follow mode 22)	95 (follow mode 22)	85 (follow mode 22)
24. 63.9K/100 800X600	25%	94 (follow mode 22)	95 (follow mode 22)	85 (follow mode 22)
25. 67.5K/75 1152X864	25%	95 (follow mode 27)	94 (follow mode 27)	87 (follow mode 27)
26. 68.6K/75 1152X870	25%	95 (follow mode 27)	94 (follow mode 27)	87 (follow mode 27)
27. @ 68.7K/85 1024X768	25%	95 (default)	94 (default)	87 (default)
28. 71.8K/76 1152X900	25%	94 (follow mode 29)	99 (follow mode 29)	87 (follow mode 29)
29. @ 72.5K/90 1024X768	25%	94 (default)	99 (default)	87 (default)
30. 75.0K/60 1600X1200	25%	97 (follow mode 32)	97 (follow mode 32)	89 (follow mode 32)
31. 77.1K/85 1152X864	25%	97 (follow mode 32)	97 (follow mode 32)	89 (follow mode 32)
32. @ 79.9K/75 1280X1024	30%	97 (default)	97 (default)	89 (default)
33. 81.2K/65 1600X1200	30%	97 (follow mode 32)	97 (follow mode 32)	89 (follow mode 32)
34. 83.6K/60 1792X1344	30%	92 (follow mode 39)	97 (follow mode 32)	90 (follow mode 39)
35. @ 85.9K/85 1280X960	30%	92 (follow mode 39)	97 (follow mode 32)	90 (follow mode 39)
36. 86.3K/60 1856X1392	30%	92 (follow mode 39)	98 (follow mode 39)	90 (follow mode 39)
37. @ 87.5K/70 1600X1200	30%	92 (follow mode 39)	98 (follow mode 39)	90 (follow mode 39)
38. 90.0K/60 1920X1440	30%	92 (follow mode 39)	98 (follow mode 39)	90 (follow mode 39)
39. @ 91.1K/85 1280X1024	30%	92 (default)	98 (default)	90 (default)
40. @ 93.7K/75 1600X1200	30%	92 (follow mode 39)	98 (follow mode 39)	90 (follow mode 39)

Note : The CAA does not execute adjustment for those modes with fixed DAC value.

" @ " means preset mode , adjust H-EHT for 13 specified preset modes via CAA .

Note : 40 factory modes are specified as above Form 1 , 27 preload modes w/o " @ " mark.

Note: DAC value of V-Moire are all fixed value without CAA adjustment , all factory modes must be stored with specified fixed DAC value as Form 1.

Note: In EEPROM map : set data 0XFF in address 80-CF of A2 page , set data 0XFF in address 00 - FF of A4 page .

CRT	LPD CRT M46QEF903X21(T)	CPT CRT M46AJS53X46(SMV)	SDI CRT M46QCK761X214(TCO/ DFT-M)
Control item			
9300/6500/5500°K Bias preset	150 (default)	145 (default)	132 (default)
9300/6500/5500°K Gain preset	130 (default)	145 (default)	148 (default)
SRGB Bias preset	150 (default)	145 (default)	132 (default)
SRGB Gain preset	125 (default)	115 (default)	135 (default)
SRGB (brightness / contrast )	129/230 (fixed both)	129/230 (fixed both)	129/230 (fixed both)
CUTOFF	3 (fixed)	3 (fixed)	3 (fixed)
OSD contrast	183 (fixed)	183 (fixed)	183 (fixed)
Focus H	0 (fixed)	0 (fixed)	0 (fixed)
Focus V	150 (fixed)	150 (fixed)	150 (fixed)
USER H-Range	45 (fixed)	45 (fixed)	45 (fixed)



RASTER (H U)	150/250 (default both)	51/111 (default both)	62/109 (default both)
ZOOM Range	40 (fixed)	40 (fixed)	40 (fixed)
V OFFSET / GAIN	118/203 (default/fixed)	118/210 (default/fixed)	157/220 (default/fixed)
SUB CONT	215 (default)	200 (default)	215 (default)
ABL	150 (default)	96 (default)	170 (default)
Sub brightness	200 (fixed)	200 (fixed)	200 (fixed)
LF (Bright Sharp)	( 3 / 3 ) (fixed both)	( 3 / 3 ) (fixed both)	( 3 / 3 ) (fixed both)
Moire H	0 (fixed)	0 (fixed)	0 (fixed)

Note: SRGB brightness ,SRGB contrast ,cut off ,OSD contrast ,focus H ,focus V ,user H-range , zoom-range ,sub contrast ,sub brightness ,LF(bright ,sharp) & Moire H ,V are all fixed value without CAA auto alignment .

## 5.2 External degaussing

5.2.1 Remove the ferromagnetic measuring equipment. Iron table etc, in the neighborhood of the apparatus within half a meter.

5.2.2 Position the set in E-W direction and degauss well via external degaussing coil.

5.2.3 Slowly increase the distance between the picture tube and degaussing coil, keeping the coil in parallel with the screen of CRT. When the distance is more than 2m, turn off the degaussing current.

5.3 Adjustment mode: 68.67KHz/85Hz with correctly adjusted video size 355x265mm Use color-analyzer (Minolta CA-100) to adjust cut-off and white balance. Before alignment, set initial data as Form 1.

5.3.1 Apply full black pattern **without video input** for raster darkness adjustment. Adjust 5612 LOT Vg2 voltage until raster appear to reach 0.06 ~ 0.08 FL.

5.3.2 Adjust 9300K color

Move OSD's cursor to "9300" bias .

Judge raster color & adjust the compensate color to make  $x = 283 \pm 5$  ,  $y = 297 \pm 5$  .

repeat adjustment until raster brightness = 0.06 ~ 0.08 FL .

Move OSD cursor to "9300 gain R,G,B." Judge 10\*10 cm small block color & adjust compensate color to make

$x = 283 \pm 5$  ,  $y = 297 \pm 5$  , repeat adjustment until

10\*10 cm small block brightness =  $41 \pm 1$  FL.

5.3.3 Adjust "6500K (sRGB)" color:

Move OSD's cursor to "6500 bias" .

Judge raster color & adjust the compensate color to make  $x = 313 \pm 5$  ,  $y = 329 \pm 5$  .repeat adjustment until raster brightness = 0.06 ~ 0.08 FL.

Move OSD cursor to 500 gain RGB . Judge 10\*10 cm small block color & adjust compensate color to make  $x = 313 \pm 5$  ,  $y = 329 \pm 5$  ,repeat adjustment until 10\*10 cm small block brightness =  $39 \pm 1$  FL.

5.3.4 Adjust 5500K color:

Move OSD cursor to "5500 bias" .

Judge raster color & adjust the compensate color to make  $x = 332 \pm 5$  ,  $y = 347 \pm 5$  , repeat adjustment until raster brightness = 0.06 ~ 0.08 FL.

Move OSD cursor to 5500 gain RGB . Judge 10\*10 cm small block color & adjust compensate color to make  $x = 332 \pm 5$  ,  $y = 347 \pm 5$  , repeat adjustment until 10\*10 cm small block brightness =  $37 \pm 1$  FL.

5.3.5 Adjust SRGB color :

Move OSD cursor to SRGB bias.

Judge raster color & adjust the compensate color to make  $x = 313 \pm 5$  ,  $y = 329 \pm 5$  , repeat adjustment until raster brightness = 0.06 ~ 0.08 FL.

Move OSD cursor to SRGB gain . **Input full white pattern**

& adjust compensate color to make  $x = 313 \pm 5$  ,  $y = 329 \pm 5$  , repeat adjustment until  $Y = 23 \pm 1$  FL.

## 5.4 Choice 9300K

Apply full white pattern, adjust ABL to reach 30.0FL $\pm$  1FL at the screen center.

Above alignment method may be changed, as long as the final results are the same: Conclusion of color adjustment (68.67kHz / 85Hz ,0.7Vpp i/p)

Pattern	Con	Bri	9300 Light o/p	6500 Light o/p	5500 Light o/p	sRGB Light o/p
10x10 block	100%	50%	41 $\pm$ 1 FL	39 $\pm$ 1 FL	37 $\pm$ 1 FL	-----
Full White	100%	50%	30.0 $\pm$ 1 FL	-----	-----	23 $\pm$ 1 FL
Full White	adjust	50%	3 ~ max FL	3 ~ max FL	3 ~ max FL	-----
Black Video	-	50%	0.06 ~ 0.08FL	0.06 ~ 0.08FL	0.06 ~ 0.08FL	0.06 ~ 0.08FL
Color coord - ination (x, y) (full white)	100%	50%	283 / 297 $\pm$ 5	313 / 329 $\pm$ 5	332 / 347 $\pm$ 5	313 / 329 $\pm$ 5

## 6. Adjustment of the picture geometry

6.1.1 Apply 1600x 1200 93.75KHz/75Hz mode :

Remove input video signal ,adjust H-size to make raster dimension till meet Fig 1 size , set brightness to 100 % by software control , adjust raster H to move the horizontal raster in the center of CRT. Change to 56.5KHz/70Hz mode , adjust brightness to 100% ,remove input video signal, adjust H-size to make raster size till 370 mm approximately , adjust raster U to move raster in the center of CRT.

6.1.2 Apply 1280 x 1024 (80KHz/75Hz) without video signal, set brightness at 100%, set H-size & V-size for raster size around 355x265 mm and set vertical position to 50%, adjust V-offset to move raster in the picture center via I<sup>2</sup>C bus.

6.1.3 Input R,G,B signal ,adjust H-position to move video on CRT center (see Fig 1, 2) , adjust the Horizontal Size to 355  $\pm$  2 mm .

6.1.4 Adjust Vertical Position to move video on CRT center (see Fig 2).

6.1.5 Adjust the Vertical Size to 265  $\pm$  2 mm.(see Fig 1)

6.1.6 Adjust picture tilt for correct top/bottom lines.(meet Fig 3 spec) (Picture tube should be mounted without tilt w.r.t. cabinet)

6.1.7 Adjust pincushion to get optimum vertical line.

6.1.8 Adjust trapezoid to get optimum vertical line.

6.1.9 Adjust balanced pincushion to get optimum vertical line.

6.1.10 Adjust the parallelogram to get optimum vertical line.

6.1.11 Adjust the Top/Bottom corner control to get best corner geometry distortion . (6.1.7, 6.1.8, 6.1.9 and 6.1.10 may need to be readjusted) **make sure total geometry distortion meet Fig 4 spec (except corners distortion must meet Note 3 spec) .**

**Note 3:** Corner top & bottom should be adjusted to optimal value & ensure the corners distortion <1.5 mm in Form1 preset modes ,the value in above table is a default value.

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6.1.12 Store the set result and exit OSD.

(the values for pincushion, trapezoid, balance pincushion and parallelogram can be copied to the other pre-set modes to shorten alignment time)

6.2 Other pre-set modes geometry adjustment

Use following procedure for all pre-set modes (except 80kHz/75Hz)

(Timing Table 1 - 14)

6.2.1 Adjust the Horizontal Position to CRT center position.

6.2.2 Adjust the Horizontal video Size to 355mm

6.2.3 Adjust the Vertical Position to CRT center position .

6.2.4 Adjust the Vertical video size to 265 mm.

6.2.5 Adjust pincushion to get optimum vertical line.

6.2.6 Adjust trapezoid to get optimum vertical line.

6.2.7 Adjust balanced pincushion to get optimum vertical line.

6.2.8 Adjust the parallelogram to get optimum vertical line ,  
(6.2.5, 6.2.6, 6.2.7 and 6.2.8 may need some iteration)

6.2.9 Adjust the Top/Bottom corner control to get best corner geometry distortion .

(6.1.7, 6.1.8, 6.1.9 and 6.1.10 may need to be readjusted) **make sure total geometry distortion meet Fig 4 spec (except corners distortion must meet Note 3 spec) .**

6.2.10 Store the set result and exit OSD.

6.2.11 Repeat above items (from 6.2.1 to 6.2.9 ) with all pre-load modes (see Form 1)& store the results to EPROM .(Note : all these parameters of geometry distortion can be stored in EPROM previously before alignment if those parameters were confirmed by auto alignment equipments & make sure they all obey below function:

a. Adapt with any one pre-load mode ,H-size should larger than 280mm when adjust H-size to minimum dimension in user operation .

6.2.12 V - size regulation & H-size regulation should be confirmed by human inspection after auto alignment to make sure they are all inside spec ,failed set should be readjusted .

criteria of human inspection :  $\leq 1.5 \text{ mm}$  (@ 31k ~ 97k) .

(at rated light o/p ,measure the image deviation between video pattern change from cross-hatch pattern to reverse cross-hatch pattern ), only check pre-set modes .

7. Convergence adjustment .

release magnetic assy located on Yoke assy ,apply 91.1K/85Hz , 1280 x 1024 mode with crosshatch pattern ,set video size as Fig 1 , remove blue video ,adjust 6 pole magnetic to let red line & green line overlap together completely ,recovery blue video,remove green video ,adjust 4 pole magnetic to let red line & blue line overlap together completely ,refer Fig 6 to make sure mis-convergence meet below spec, fix magnetic-assy if mis-convergence meet spec.

Area C :  $\leq 0.35 \text{ mm}$  Area A :  $\leq 0.25 \text{ mm}$

Note: Stick small piece magnetic on CRT is available if above adjustment can not meet spec.

8. Focus adjustment

Apply 1280 X 1024 (91.1K/85hz) mode ,set brightness at 50%

and contrast at 100% , fill ME pattern shown at Spec in full screen , adjust focus pot-meters which are located on fly-back transformer until each M & E character is clearly identified in all display area .

9. Adjustment of Moire

Store H - Moire & V-Moire DAC value in EEROM according to

Form 1 preset value , the moire is acceptable if not exceed 1/3

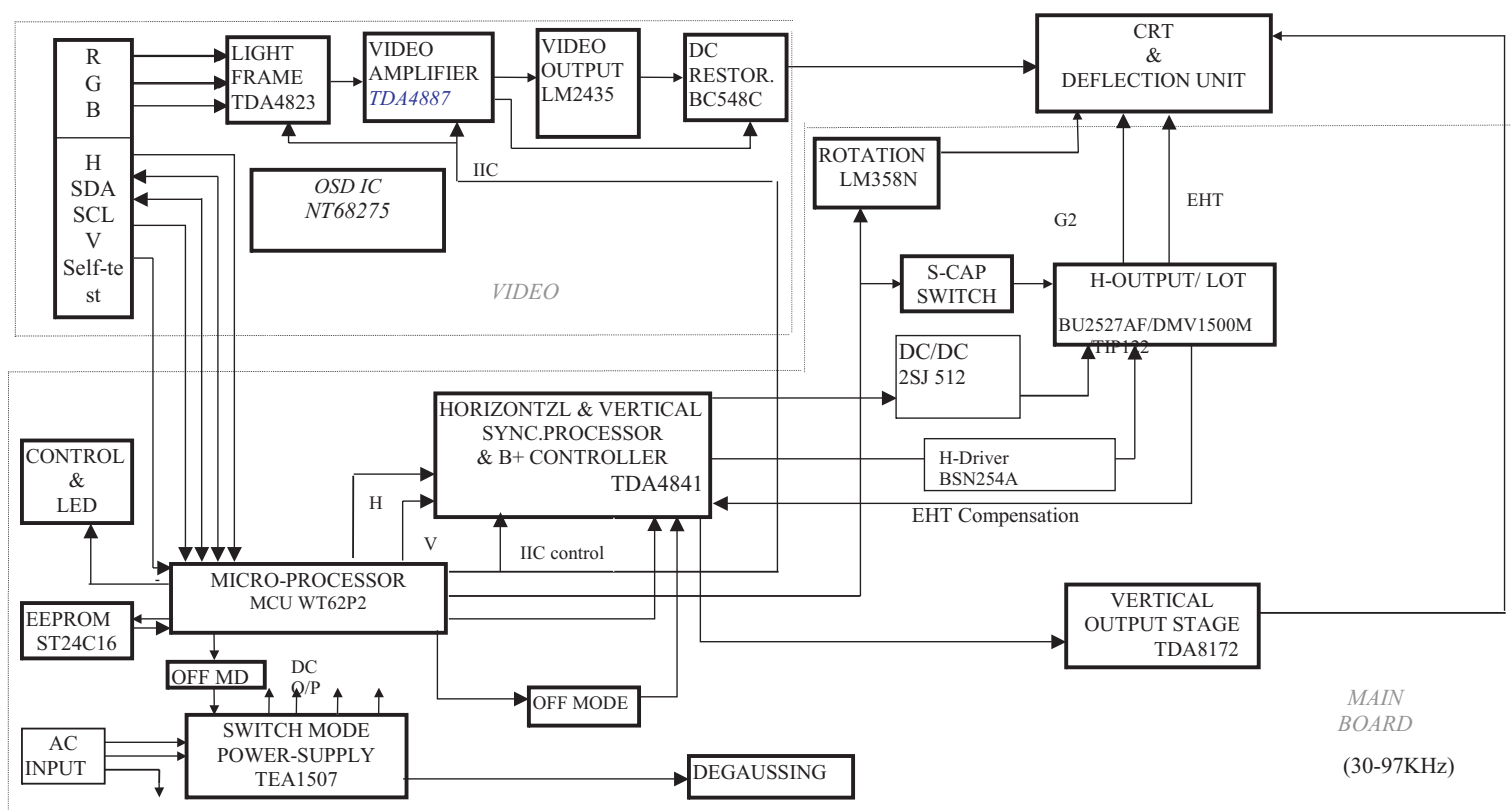
area at 15 FL contrast . (all factory modes are available for this spec)

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[illegible]

# Block Diagram

## • FUNCTION BLOCK OF 109B6

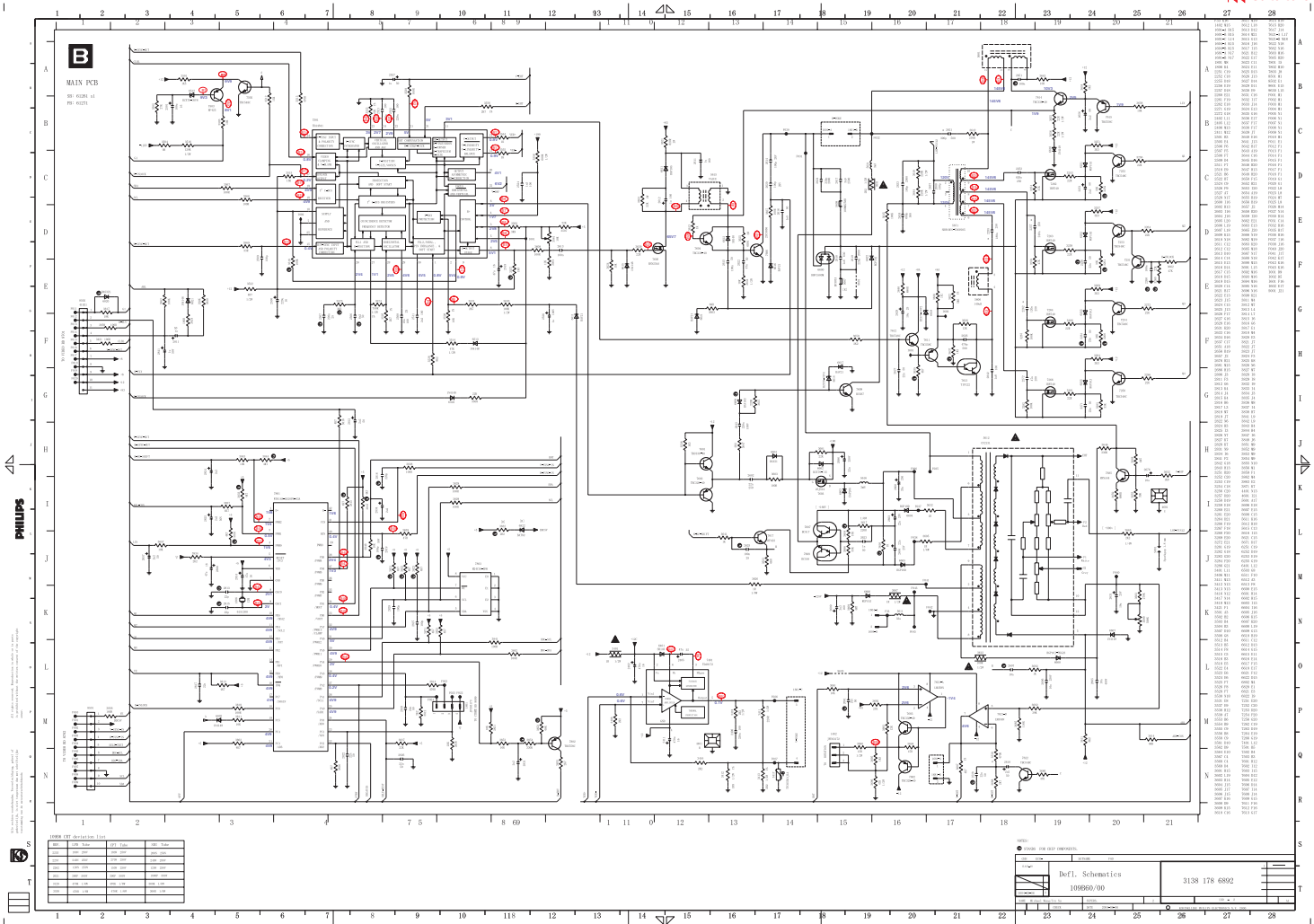


# Main Schematic Diagram

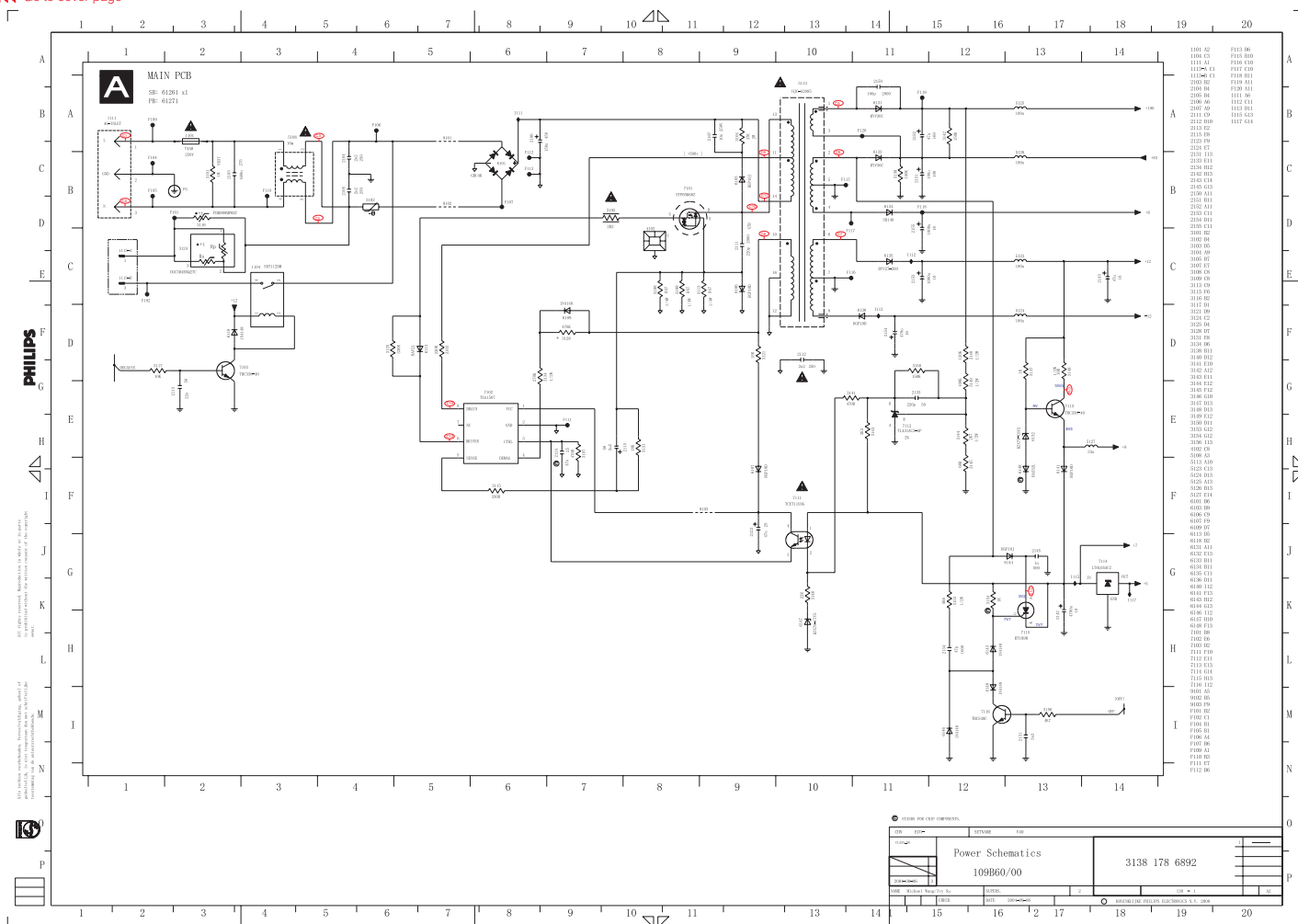
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### Power Schematic Diagram



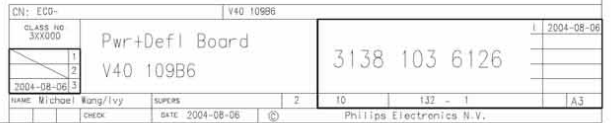


## 109B6 CRT

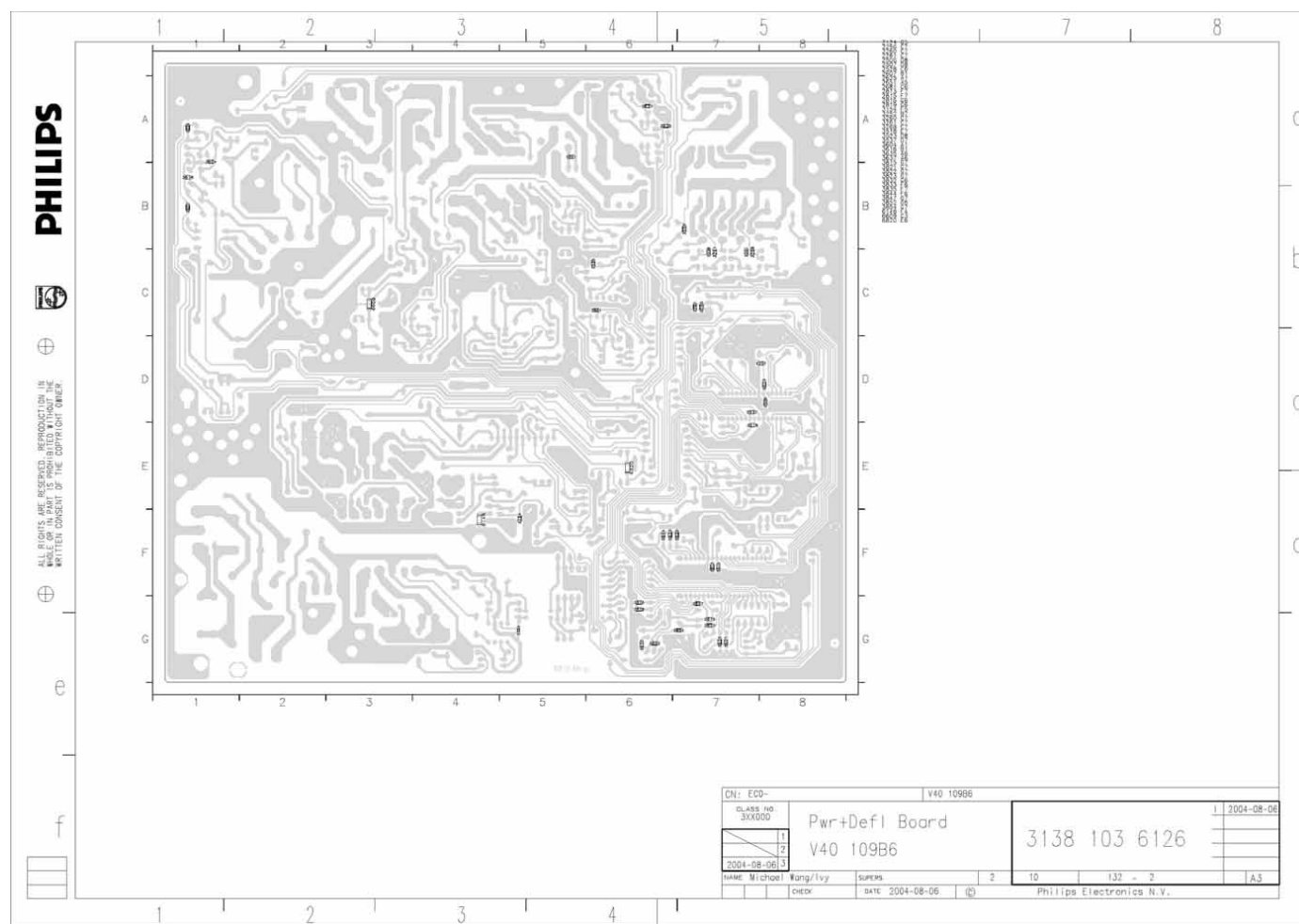
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## Main Board C.B.A.-2

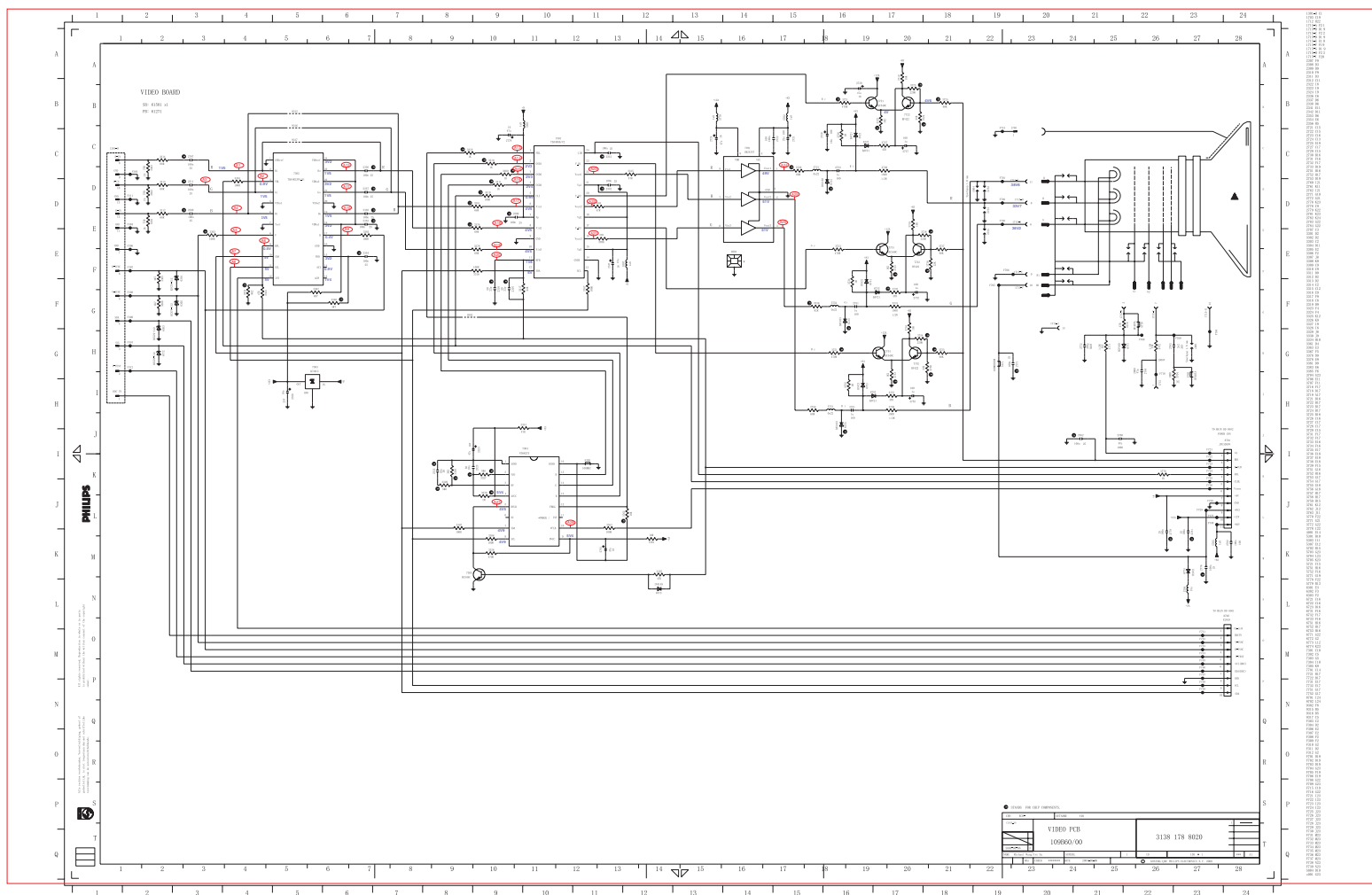


# Video Schematic Diagram

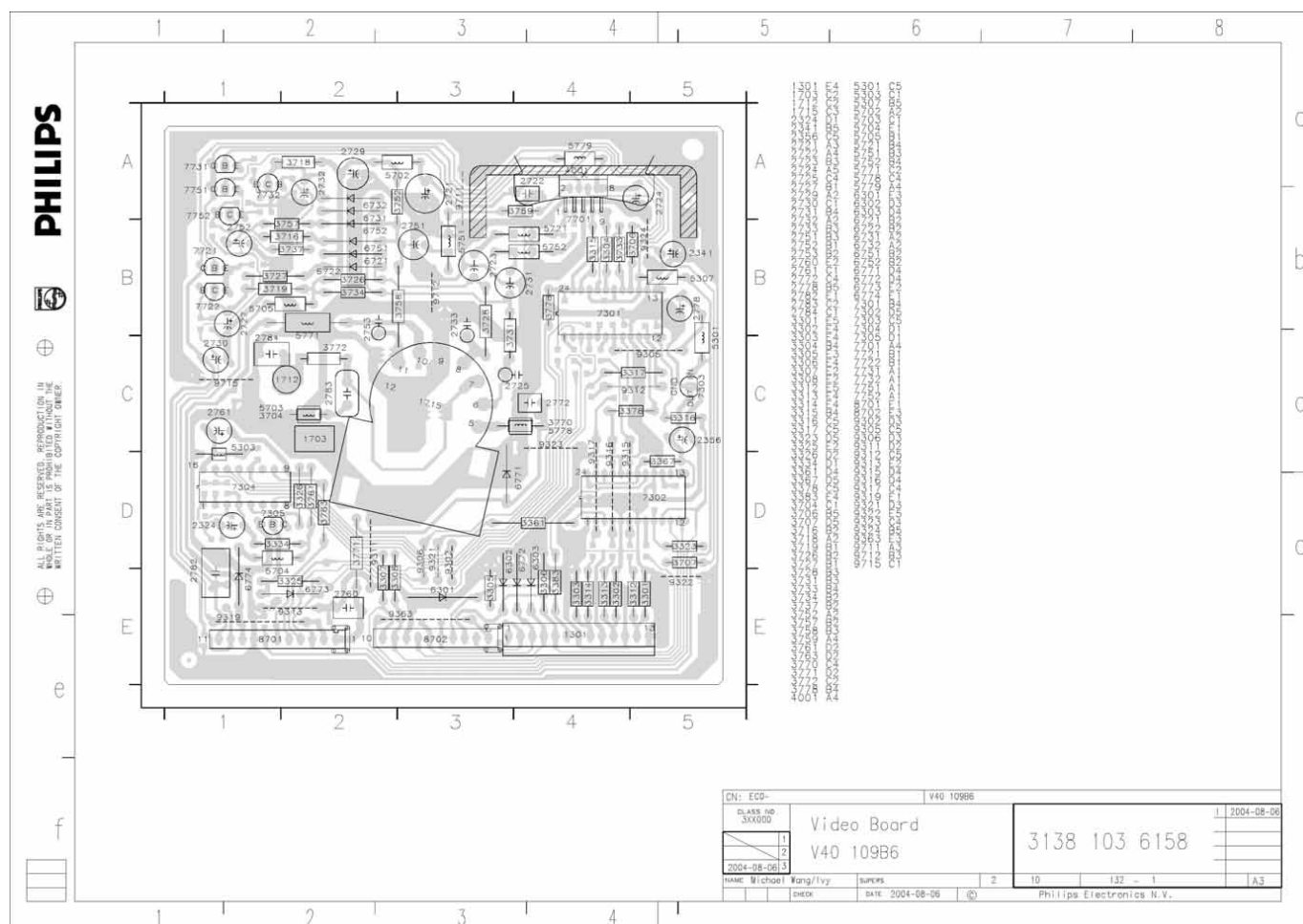
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## Video Board C.B.A-1

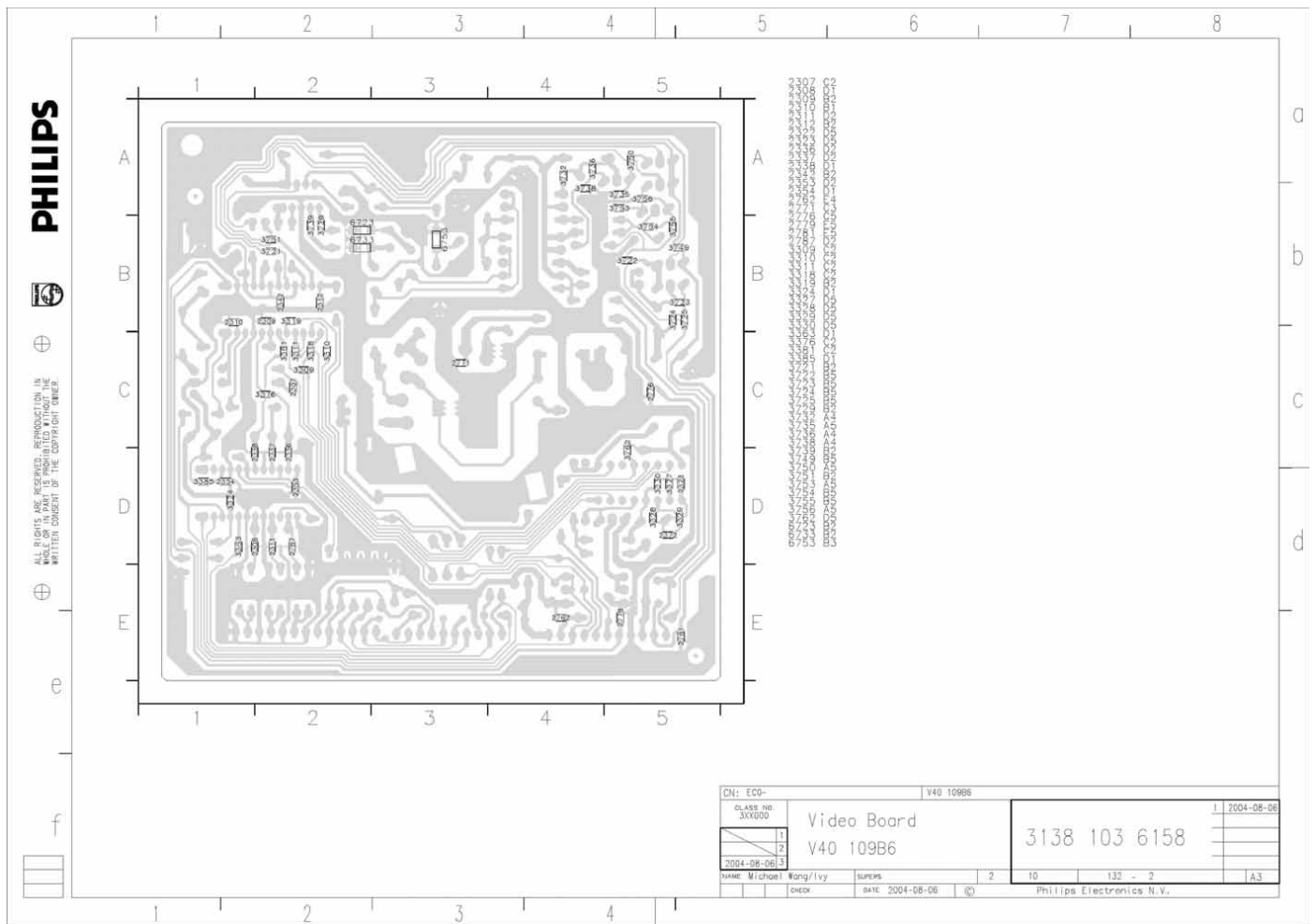


Video Board C.B.A-2

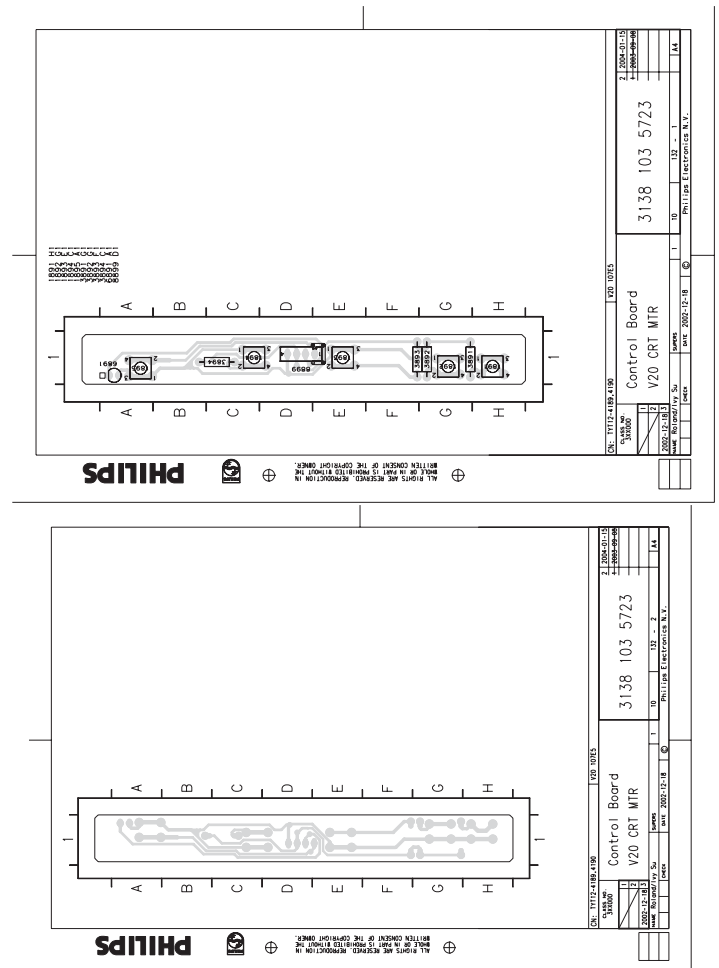
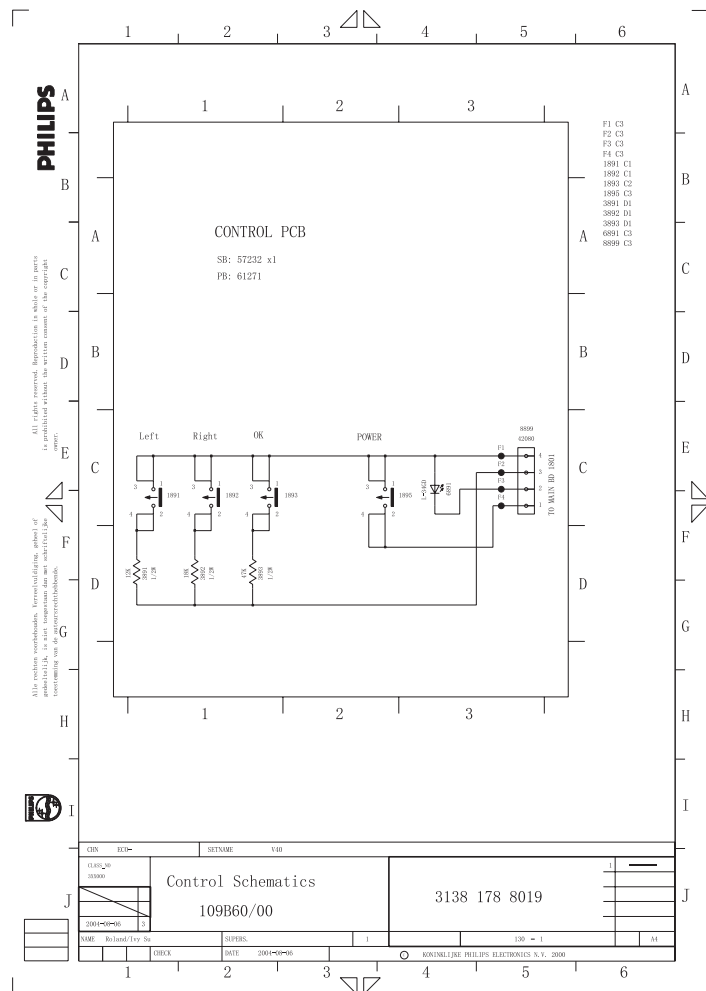
109B6 CRT

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### Control Schematic Diagram & C.B.A

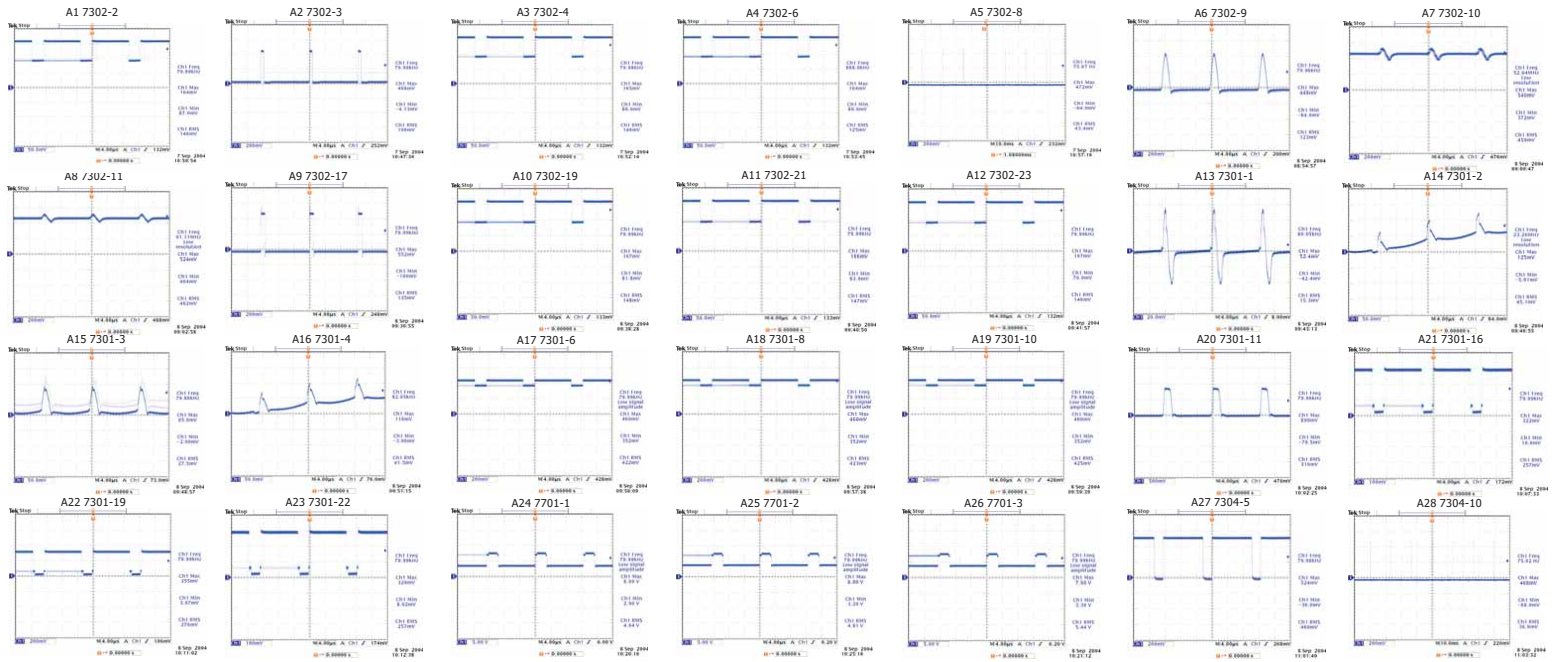




# WAVEFORM

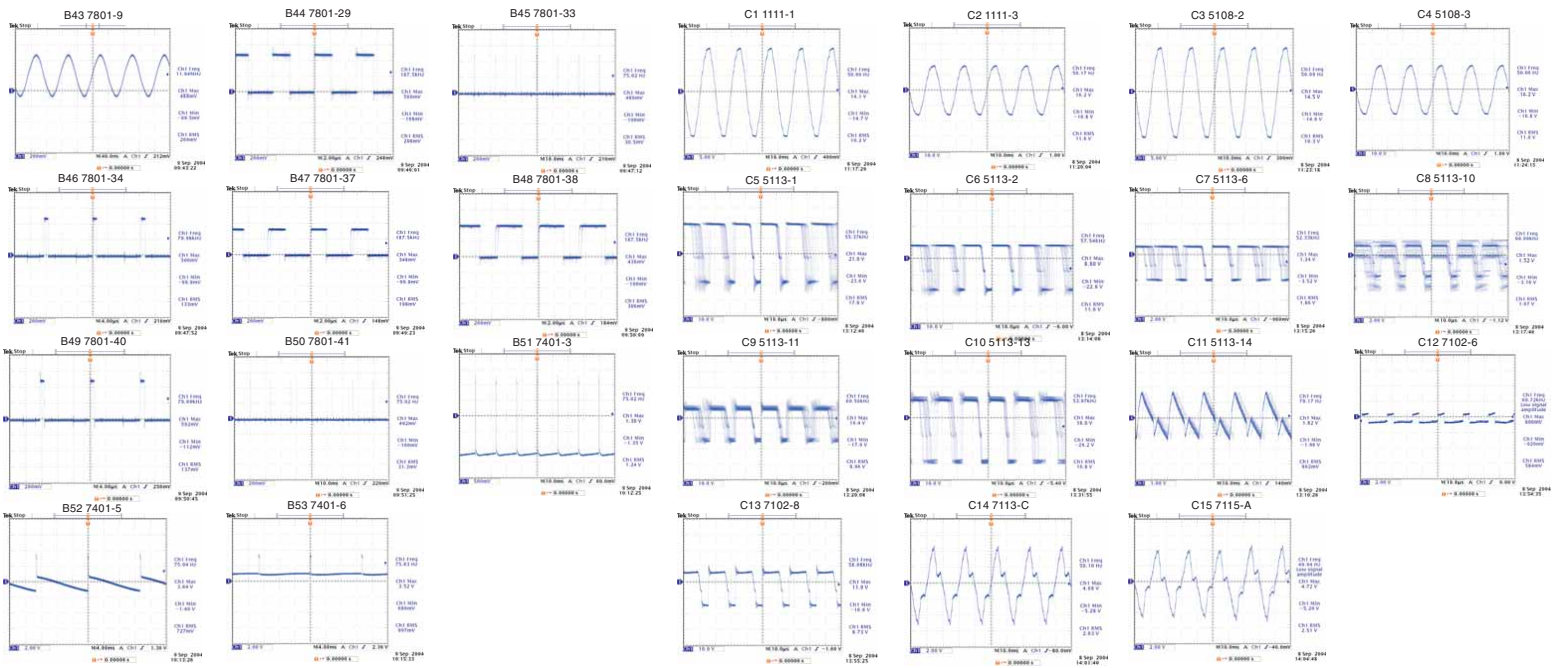
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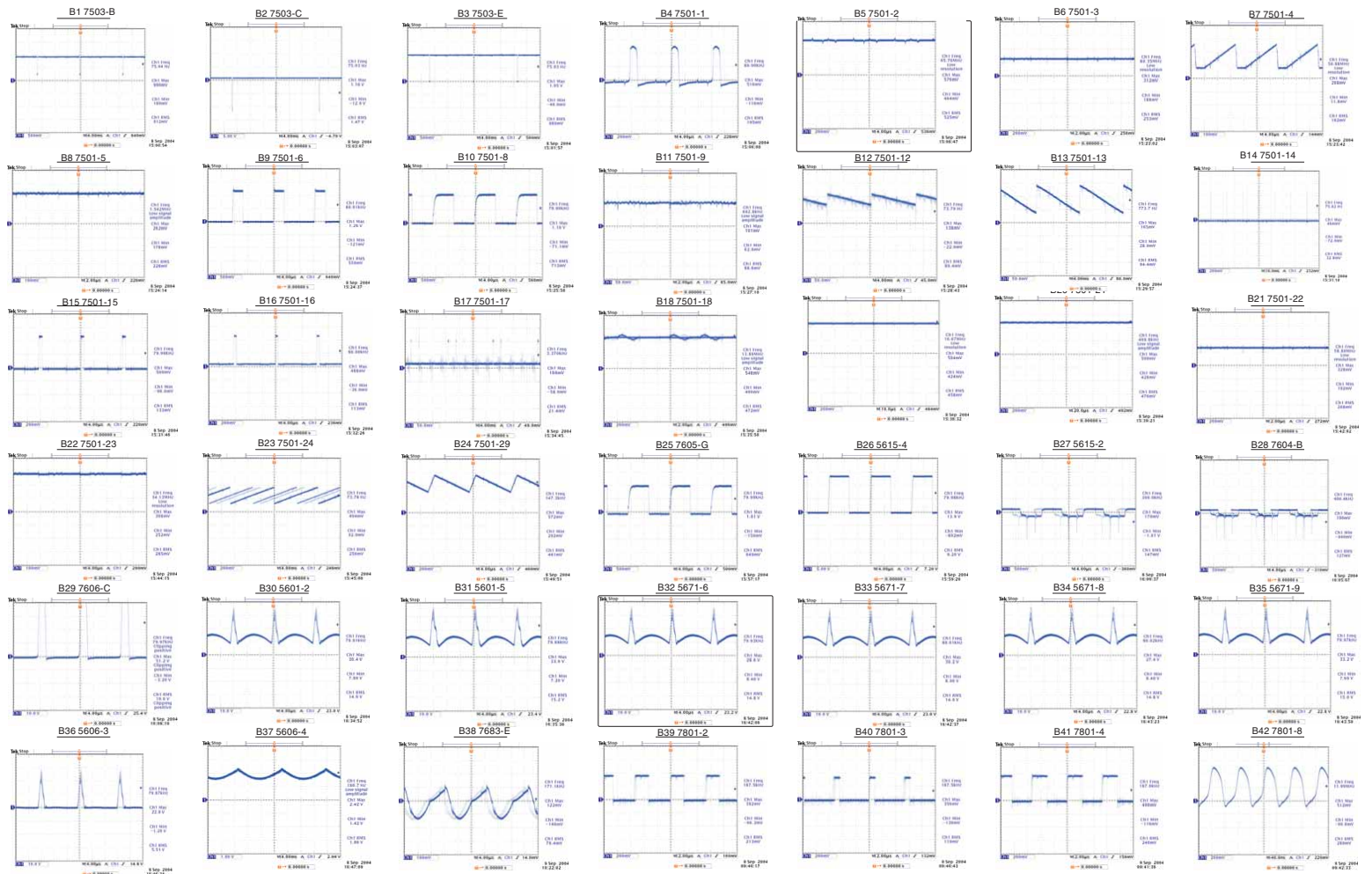


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# WAVEFORM (Continued)

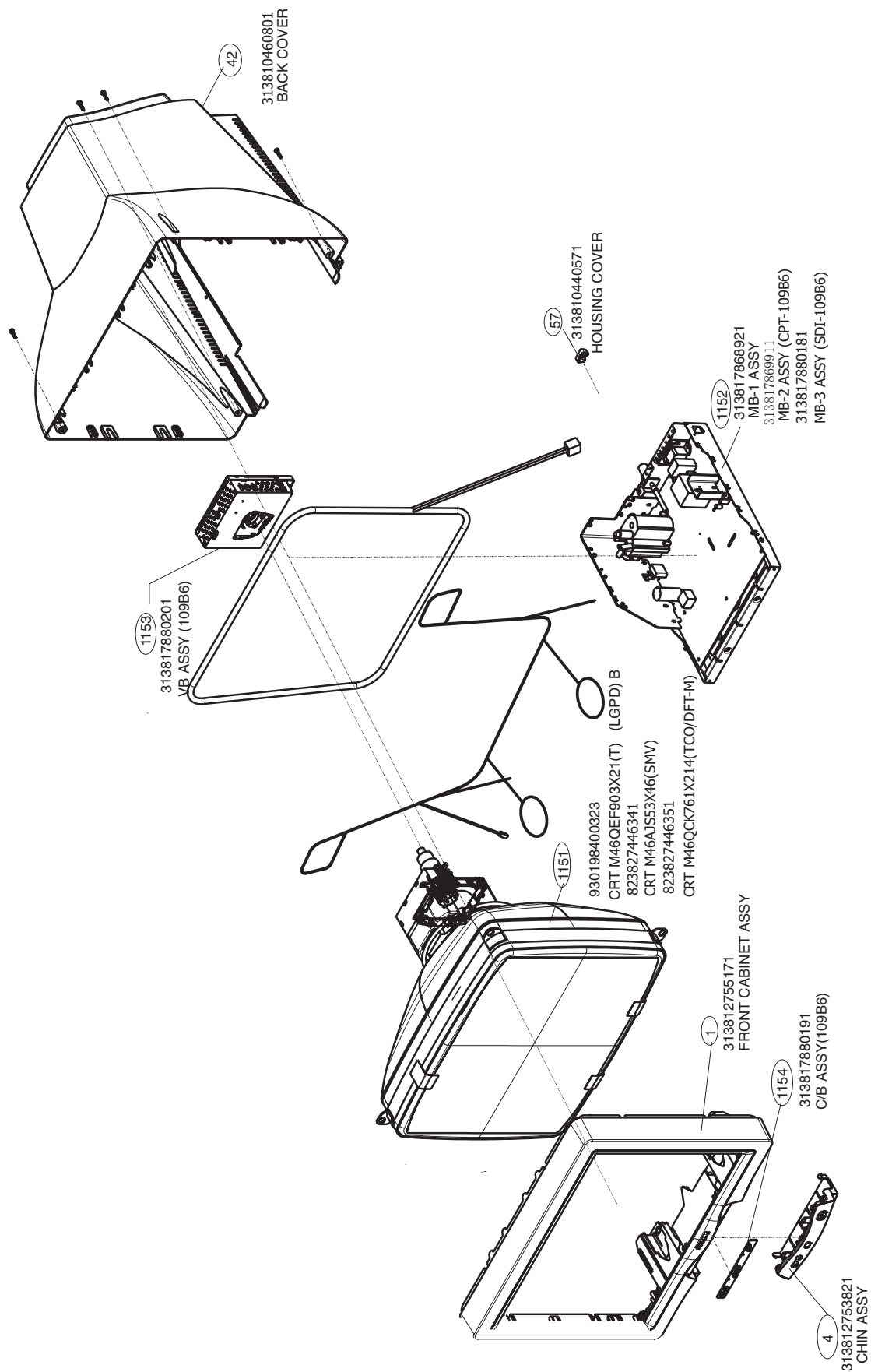


# WAVEFORM (Continued)



## Exploded View

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## Spare Parts List

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Model : 109B60/00 863900015742(LGPD)	2154	203803527205	ELCAP KM 16V S 470U PM20 A	3113	213811273477	RST CRB CFR-25 A 0R47 PM5 A
Mechanical Parts	2155	203803513205	ELCAP RGA 16V S 1000U PM20 B	3115	213810113331	RST CRB CFR-12 A 330R PM5 A
0001 313812755171 FRONT CABINET ASSY	2251	203801750222	ELCAP REA 50V S 2U2 PM20 A	3117	212210102201	RST CRB CF1/6 A 10K PM5 A
0004 313812753821 CHIN ASSY	2252	203830100222	CAP MPP MPS 250V S 820N PM5 B	3121	213810113159	RST CRB CFR-12 A 15R PM5 A
0042 313810460801 BACK COVER	2256	223858015641	CER2 0805 X7R 50V 22N PM10 R	3124	213866000037	PTC DBL-MONO 270V 4R5 P3020 B
0003 313812753812 PEDESTAL ASSY	2260	223891015649	CER2 0805 X7R 25V 100N PM10 R	3125	213810113331	RST CRB CFR-12 A 330R PM5 A
0057 313810440571 HOUSING COVER	2261	223858015641	CER2 0805 X7R 50V 22N PM10 R	3131	213810113183	RST CRB CFR-12 A 18K PM5 A
Packing Parts	2271	202055290834	CER2 DC F 50V S 22N P8020 A	3134	212211000421	RST MFLM MF1/2WS A 270K PM1 A
0450 313810663701 CARTON	2272	823827446501	CAP PPN 250V S 56N PM5 B	3138	212210102215	RST CRB CF1/6 A 150K PM5 A
0451 313810662921 CUSHION - TOP	2402	203803511222	ELCAP REA 16V S 470U PM20 A	3140	212211000412	RST MFLM MF1/2WS A 120K PM1 A
0452 313810662931 CUSHION - BTM	2405	203803511401	ELCAP REA 35V S 47U PM20 A	3141	213810113471	RST CRB CFR-12 A 470R PM5 A
0454 313810656651 PE BAG	2406	203830250098	CAP MPOL 100V S 330N PM10 A	3142	212210102215	RST CRB CF1/6 A 150K PM5 A
CRT Panel	2411	202202000909	ELCAP SM 16V S 470U PM20 A	3143	212210102195	RST CRB CF1/6 A 3K3 PM5 A
1151 930198400323 CRT M46QEF903X21(T) (LGPD) B	2501	203803511204	ELCAP REA 16V S 100U PM20 A	3144	212211000367	RST MFLM MF1/2WS A 2K7 PM1 A
PCB ASSY	2505	203803521209	ELCAP GS 16V S 220U PM20 A	3145	213810113689	RST CRB CFR-12 A 68R PM5 A
1154 313817880191 C/B ASSY(109B6)	2506	223858015635	CER2 0805 X7R 50V 8N2 PM10 R	3146	213810113229	RST CRB CFR-12 A 22R PM5 A
1152 313817868921 MB-1 ASSY	2507	223891019854	CER2 0805 Y5V 25V 220N P8020 R	3147	213810113102	RST CRB CFR-12 A 1K PM5 A
1153 313817880201 VB ASSY (109B6)	2508	203830250218	CAP MPOL 100V S 10N PM2 A	3148	212210100315	RST MFLM MF1/2WS A 10R PM1 A
Accessory	2509	202055290794	CER2 DC B 50V S 100P PM10 A	3149	212211000409	RST MFLM MF1/2WS A 100K PM1 A
4444 313810610425 CD ROM - SERVICE MANUAL	2511	203830150135	CAP PP PPN 100V S 2N2 PM5 R	3150	212210102215	RST CRB CF1/6 A 150K PM5 A
4444 313810610426 SERVICE MANUAL	2518	203801750218	ELCAP REA 16V S 47U PM20 A	3153	212211000376	RST MFLM MF1/2WS A 5K6 PM1 A
0601 313811707741 E-D.F.U. ASSY	2521	203830250095	CAP MPOL 100V S 100N PM10 A	3154	232273061012	RST SM 0805 RC11 1K PM5 R
1053 313816874231 MAINS CORD	2522	203830250125	CAP MPOL 100V S 220N PM10 A	3156	212210102197	RST CRB CF1/6 A 4K7 PM5 A
Miscellanea	2524	203830150141	CAP PP PPN 100V S 1N5 PM5 A	3128	213810113474	RST CRB CFR-12 A 470K PM5 A
8056 313819873891 CBLE-931 2/630 OE BENT AWG24	2526	203803511701	ELCAP REA 100V S 1U PM20 A	3530	213810113471	RST CRB CFR-12 A 470R PM5 A
1054 313818878041 CORD SUB-D 15/1M8/12 330942 GY	2527	202202000836	ELCAP GS 50V S 1U PM20 A	3266	213810113229	RST CRB CFR-12 A 22R PM5 A
8751 313818875321 CBLE CLIP/25/RING TERM BRAID	2528	223858015641	CER2 0805 X7R 50V 22N PM10 R	3267	213810113104	RST CRB CFR-12 A 100K PM5 A
8752 313818878061 CBLE FAST5.8/80/FAST BRAID	2600	202202000731	ELCAP GS 250V S 33U PM20 B	3268	232273061333	RST SM 0805 RC11 33K PM5 R
8753 313818878071 CBLE FAST5.8/100/FAST BRAID	2602	203830250142	CAP MPOL 250V S 22N PM10 A	3269	212210102195	RST CRB CF1/6 A 3K3 PM5 A
8501 313816879541 CBLE OE 10P/310/10P OE AWG24	2603	203803527301	ELCAP KM 25V S 22U PM20 A	3272	212210102205	RST CRB CF1/6 A 22K PM5 A
8502 313818878091 CBLE OE11/340/11 OE KINK AWG24	2604	203803527301	ELCAP KM 25V S 22U PM20 A	3281	213810113229	RST CRB CFR-12 A 22R PM5 A
1806 243854300061 RES XTL 12MHZ 30P HC49/U B	2605	203830250166	CAP MPOL 400V S 10N PM10 A	3282	213810113104	RST CRB CFR-12 A 100K PM5 A
1255 313817880941 EEPROM ASSY (LG-109B6)	2606	203830250229	CAP MPOL 250V S 10N PM5 A	3283	212210102207	RST CRB CF1/6 A 33K PM5 A
0213 313811580841 LABEL-EEPROM(LPD)	2607	223858015636	CER2 0805 X7R 50V 10N PM10 R	3284	212210102195	RST CRB CF1/6 A 3K3 PM5 A
1101 242208600208 FUSE 5X20 HT 4A 250V IEC B	2609	203803521804	ELCAP GS 160V S 3U3 PM20 A	3286	212210102205	RST CRB CF1/6 A 22K PM5 A
1104 242213207402 RELAY 1P 12V 10/80A SDT-SS L	2610	203801750222	ELCAP REA 50V S 2U2 PM20 A	3401	212020200001	RST FUSE RFS1/2 A 1R PM5 A
PCB ASSY	2611	203803522802	ELCAP BP NK 160V S 0U47 PM20 A	3406	213810113222	RST CRB CFR-12 A 2K2 PM5 A
1152 313817868921 MB-1 ASSY	2612	203803521802	ELCAP GS 160V S 1U PM20 A	3411	212211000338	RST MFLM MF1/2WS A 220R PM1 A
2806 203801750218 ELCAP REA 16V S 47U PM20 A	2613	225279508453	CER2 DC Y5V 50V S 100N P8020 A	3412	212211000302	RST MFLM MF1/2WS A 1R8 PM1 A
2811 202202000836 ELCAP GS 50V S 1U PM20 A	2614	202055890604	CERHDT RR 2KV S 100P PM10 A	3413	212211000304	RST MFLM MF1/2WS A 2R2 PM1 A
2812 203801750222 ELCAP REA 50V S 2U2 PM20 A	2615	225279508453	CER2 DC Y5V 50V S 100N P8020 A	3416	213810113222	RST CRB CFR-12 A 2K2 PM5 A
2813 223886115229 CER1 0805 NP0 50V 22P PM5 R	2616	202055290809	CER2 DC B 50V S 1N5 PM10 A	3417	212261200062	NTC DC TTC-501 S 500R PM5 A
2814 203801750218 ELCAP REA 16V S 47U PM20 A	2617	222237590633	CAP PP-MPOL 2KV5 S 3N9 PM5 B	3418	212211000304	RST MFLM MF1/2WS A 2R2 PM1 A
2815 223886115229 CER1 0805 NP0 50V 22P PM5 R	2618	202233300373	CAP PP PPN 630V S 1N8 PM5 B	3421	212210102181	RST CRB CF1/6 A 100R PM5 A
2816 223886115221 CER1 0805 NP0 50V 220P PM5 R	2619	202055890561	CERHDT RR 2KV S 220P PM10 A	3501	212210102191	RST CRB CF1/6 A 1K5 PM5 A
2817 202055290834 CER2 DC F 50V S 22N P8020 A	2620	202055890604	CERHDT RR 2KV S 100P PM10 A	3502	213810113273	RST CRB CFR-12 A 27K PM5 A
2818 202055290834 CER2 DC F 50V S 22N P8020 A	2622	202055290834	CER2 DC F 50V S 22N P8020 A	3503	212210102201	RST CRB CF1/6 A 10K PM5 A
2819 223886115101 CER1 0805 NP0 50V 100P PM5 R	2623	202055290807	CER2 DC B 50V S 1N PM10 A	3504	213810100369	RST JUMP CR-12 A MAX 0R01 A
2822 202055290834 CER2 DC F 50V S 22N P8020 A	2624	225271214316	CERHDT F-Y5R 2KV S 330P PM10 A	3507	212210102205	RST CRB CF1/6 A 22K PM5 A
2824 203801750222 ELCAP REA 50V S 2U2 PM20 A	2625	223891015649	CER2 0805 X7R 25V 100N PM10 R	3508	212210102205	RST CRB CF1/6 A 22K PM5 A
2825 203801750222 ELCAP REA 50V S 2U2 PM20 A	2626	202055790146	CER2 DC B 500V S 470P PM10 A	3512	213810113153	RST CRB CFR-12 A 15K PM5 A
2826 202055290834 CER2 DC F 50V S 22N P8020 A	2627	202055290834	CER2 DC F 50V S 22N P8020 A	3513	213810113471	RST CRB CFR-12 A 470R PM5 A
2827 202055290794 CER2 DC B 50V S 100P PM10 A	2628	203803521303	ELCAP GS 25V S 10U PM20 A	3514	212211000401	RST MFLM MF1/2WS A 47K PM1 A
2828 202055290794 CER2 DC B 50V S 100P PM10 A	2631	203803521303	ELCAP GS 25V S 10U PM20 A	3515	213810113153	RST CRB CFR-12 A 15K PM5 A
2831 203801750222 ELCAP REA 50V S 2U2 PM20 A	2633	202055890604	CERHDT RR 2KV S 100P PM10 A	3516	213291511204	RST MFLM MBB0207 A 120K PM1 A
2834 203801750222 ELCAP REA 50V S 2U2 PM20 A	2634	202055790146	CER2 DC B 500V S 680P PM10 A	3518	232273061104	RST SM 0805 RC11 100K PM5 R
2841 202202000836 ELCAP GS 50V S 1U PM20 A	2637	225271214116	CERHDT F-Y5R 2KV S 150P PM10 A	3522	212211000311	RST MFLM MF1/2WS A 4R7 PM1 A
2842 203830250226 CAP MPOL 100V S 1U8 PM5 B	2651	223891015649	CER2 0805 X7R 25V 100N PM10 R	3523	232273061332	RST SM 0805 RC11 3K3 PM5 R
2843 203830250125 CAP MPOL 100V S 220N PM10 A	2656	203801750222	ELCAP REA 50V S 2U2 PM20 A	3524	212211000353	RST MFLM MF1/2WS A 750R PM1 A
2255 203830100165 CAP PP PPN 250V S 180N PM5 B	2657	203801750222	ELCAP REA 50V S 2U2 PM20 A	3525	212211000367	RST MFLM MF1/2WS A 2K7 PM1 A
2257 823827446511 CAP MPP 250V S 240N PM5 B	2676	203803521303	ELCAP GS 25V S 10U PM20 A	3526	212211000383	RST MFLM MF1/2WS A 10K PM1 A
2262 203830100307 CAP MPP MPS 250V S 120N PM5 B	2681	223858015641	CER2 0805 X7R 50V 22N PM10 R	3528	213810113822	RST CRB CFR-12 A 8K2 PM5 A
2621 202055790643 CER2 DC B 500V S 390P PM10 A	2686	202202000729	ELCAP GS 250V S 22U PM20 B	3531	212210102194	RST CRB CF1/6 A 2K7 PM5 A
2103 203831000014 CAP MPP 275V S 680N PM10 B				3537	232273061152	RST SM 0805 RC11 1K5 PM5 R
2104 202055490163 CERSAF NSB 250V S 2N2 PM20 B	3749	232273091002	RST SM 0805 JUMP. MAX 0R05 R	3264	212210102205	RST CRB CF1/6 A 22K PM5 A
2105 202055490163 CERSAF NSB 250V S 2N2 PM20 B	3750	232273091002	RST SM 0805 JUMP. MAX 0R05 R	3538	212210102191	RST CRB CF1/6 A 1K5 PM5 A
2106 202202000976 ELCAP LP 450V S 150U PM20 B	3251	212210102195	RST CRB CF1/6 A 3K3 PM5 A	3539	213810113911	RST CRB CFR-12 A 910R PM5 A
2107 203830250229 CAP MPOL 250V S 10N PM5 A	3252	232273061333	RST SM 0805 RC11 33K PM5 R	3553	212211000392	RST MFLM MF1/2WS A 22K PM1 A
2111 225260214216 CER2 DC X7R 2KV S 220P PM10 A	3253	213810113229	RST CRB CFR-12 A 22R PM5 A	3554	213810113102	RST CRB CFR-12 A 1K PM5 A
2112 202055490158 CERSAF CD 250V S 2N2 PM20 B	3254	213810113473	RST CRB CFR-12 A 47K PM5 A	3555	213810113102	RST CRB CFR-12 A 1K PM5 A
2113 202055290834 CER2 DC F 50V S 22N P8020 A	3256	212210102205	RST CRB CF1/6 A 22K PM5 A	3556	212211000367	RST MFLM MF1/2WS A 2K7 PM1 A
2115 202031001471 ELCAP KM 50V S 2U2 PM20 A	3257	212210102195	RST CRB CF1/6 A 3K3 PM5 A	3558	231291516804	RST MFLM MBB0207 A 680K PM1 A
2123 203801750285 ELCAP REA 25V S 47U PM20 A	3258	213810113229	RST CRB CFR-12 A 22R PM5 A	3562	213810113392	RST CRB MBB-12 A 3K9 PM5 A
2124 223891015645 CER2 0805 X7R 25V 47N PM10 R	3259	213810113473	RST CRB CFR-12 A 47K PM5 A	3564	212210102202	RST CRB CF1/6 A 12K PM5 A
2131 202055290814 CER2 DC B 50V S 3N3 PM10 A	3260	232273061223	RST SM 0805 RC11 22K PM5 R	3567	212210102181	RST CRB CF1/6 A 100R PM5 A
2133 202055290798 CER2 DC B 50V S 220P PM10 A	3261	232273061333	RST SM 0805 RC11 33K PM5 R	3568	212210102181	RST CRB CF1/6 A 100R PM5 A
2134 225256108406 CER1 DC 50V S 47P PM10 A	3101	232224213105	RST MGL VSB 1K S 1M PM5 A	3569	213810113339	RST CRB CFR-12 A 33R PM5 A
2142 202202000716 ELCAP GS 10V S 4700U PM20 B	3102	213866000027	NTC DC SCK-104 S 10R PM15 B	3601	212210102205	RST CRB CF1/6 A 22K PM5 A
2143 203801750218 ELCAP REA 16V S 47U PM20 A	3103	213810113331	RST CRB CFR-12 A 330R PM5 A	3602	213810113102	RST CRB CFR-12 A 1K PM5 A
2145 202055790151 CER2 DC B 500V S 1N PM10 A	3104	213810050511	MET FLM RST RSS2T 47K 6E	3603	212210102181	RST CRB CF1/6 A 100R PM5 A
2150 202055890604 CERHDT RR 2KV S 100P PM10 A	3105	212020200002	RST FUSE RFS1/2 A 2R2 PM5 A	3604	232273061153	RST SM 0805 RC11 15K PM5 R
2151 203803521706 ELCAP GS 100V S 100U PM20 B	3107	213810113471	RST CRB CFR-12 A 470R PM5 A	3605	213810113108	RST CRB CFR-12 A 1R PM5 A
2152 202202000717 ELCAP GS 160V S 47U PM20 B	3108	213811273477	RST CRB CFR-25 A 0R47 PM5 A	3606	212210102207	RST CRB CF1/6 A 33K PM5 A
2153 203803513205 ELCAP RGA 16V S 1000U PM20 B	3109	213811273477	RST CRB CFR-25 A 0R47 PM5 A			

## Spare Parts List

3607	212020200001	RST FUSE RFS1/2 A 1R PM5 A	3856	212210102181	RST CRB CF1/6 A 100R PM5 A	6143	933256030673	DIO SIG 1N4148 A (VISH) A
3608	212210102181	RST CRB CF1/6 A 100R PM5 A	3859	212210102181	RST CRB CF1/6 A 100R PM5 A	6144	933497950673	DIO REC RGP10J A (VISH) A
3609	212211000442	RST MFLM MF1/2WS A 4M7 PM1 A	3862	212210102197	RST CRB CF1/6 A 4K7 PM5 A	6146	933256030673	DIO SIG 1N4148 A (VISH) A
3610	212211000418	RST MFLM MF1/2WS A 220K PM1 A	3863	213810113104	RST CRB CFR-12 A 100K PM5 A	6147	933117760133	DIO REG BZX79-C7V5 A (PHSE) R
3611	213810113822	RST CRB CFR-12 A 8K2 PM5 A	3871	212210102197	RST CRB CF1/6 A 4K7 PM5 A	6148	933913910115	DIO SIG SM BAS32L (PHSE) R
3612	212210102181	RST CRB CF1/6 A 100R PM5 A	3825	212210102197	RST CRB CF1/6 A 4K7 PM5 A	6600	932216961687	DIO REC DMV1500M (ST00) L
3613	213810113102	RST CRB CFR-12 A 1K PM5 A	3826	212210102197	RST CRB CF1/6 A 4K7 PM5 A	7102	935267356112	IC TEA1507P/N1 (PHSE) L
3614	213810113682	RST CRB CFR-12 A 6K8 PM5 A	3827	212210102205	RST CRB CF1/6 A 22K PM5 A	7103	933953420676	TRA SIG TBC338-40 (TOSJ) L
3615	213810113221	RST CRB CFR-12 A 220R PM5 A	3828	212210102181	RST CRB CF1/6 A 100R PM5 A	7111	932214014667	OPT CP TCET1103(G) (VISH) L
3616	232273061102	RST SM 0805 RC11 1K PM5 R	3829	212210102181	RST CRB CF1/6 A 100R PM5 A	7112	932208697676	IC TL431ACZ S (ST00) A
3617	213810113221	RST CRB CFR-12 A 220R PM5 A	3833	232273061472	RST SM 0805 RC11 4K7 PM5 R	7113	933953420676	TRA SIG TBC338-40 (TOSJ) A
3621	212010500003	RST MOX 2W RSS S 820R PM5 B	3834	213810113221	RST SM CFR-12 A 2K2 PM5 A	7114	932208234676	IC L78L05ACZ (ST00) A
3622	212211000376	RST MFLM MF1/2WS A 5K6 PM1 A	3835	232273061472	RST SM 0805 RC11 4K7 PM5 R	7115	933826850126	THYRIS BT169B (PHSE) A
3623	213810500212	RST MOX 2W RSS S 22K PM5 B	3836	212210102205	RST CRB CF1/6 A 22K PM5 A	7116	932209011673	TRA SIG BC548C (KECO) A
3624	213810113153	RST CRB CFR-12 A 15K PM5 A	3837	212210102197	RST CRB CF1/6 A 4K7 PM5 A	7101	932215891687	FET POW STP6NC60 (ST00) L
3625	212010500031	RST MOX 3W RSS S 0R91 PM5 B	3838	212210102181	RST CRB CF1/6 A 100R PM5 A	7603	932218832687	FET POW FQP6P25 (FSC0) L
3626	213810113108	RST CRB CFR-12 A 1R PM5 A	3841	212210102181	RST CRB CF1/6 A 100R PM5 A	7606	932221100682	TRA POW 2SC5856 (TOSJ) Y
3627	212210102181	RST CRB CF1/6 A 100R PM5 A	3842	212210102181	RST CRB CF1/6 A 100R PM5 A	7613	931101033687	TRA POW TIP122 (ONSE) L
3629	213810113229	RST CRB CFR-12 A 22R PM5 A	5601	313816878191	LINEARITY COIL	7401	933922940682	IC TDA8172 (ST00) L
3630	212211000409	RST MFLM MF1/2WS A 100K PM1 A	5606	313818875161	TFM SIG LS-NB02C-009	7803	932218650682	IC AT24C16A-10P1-2.7 (ATME) L
3631	212020200016	RST FUSE RFU1/3 A 2R2 PM5 A	5608	313816872631	BEAD COIL	7251	932209011673	TRA SIG BC548C (KECO) A
3632	213810113108	RST CRB CFR-12 A 1R PM5 A	5611	242253597416	IND FXD SP0406 A 33U PM10 B	7252	932209011673	TRA SIG BC548C (KECO) A
3633	212210101507	RST CRB CF1/6 A 6K8 PM5 A	5612	823827446491	LOT	7253	932209011673	TRA SIG BC548C (KECO) A
3634	213810113159	RST CRB CFR-12 A 15K PM5 A	5615	313819871371	TFM SIG DRIVER LS-PH03D-006	7254	932209011673	TRA SIG BC548C (KECO) A
3635	232273061472	RST SM 0805 RC11 4K7 PM5 R	5616	313818871121	DRUM CHOKE	7256	932209011673	TRA SIG BC548C (KECO) A
3637	232273061122	RST SM 0805 RC11 1K2 PM5 R	5621	242253600039	IND FXD TSL0808 S 3700U PM5 A	7262	932212802687	FET POW IRF540 (ST00) L
3638	212210102202	RST CRB CF1/6 A 12K PM5 A	5671	313818875111	TFM POW DAF SRW19ES-T36V005	7263	932212802687	FET POW IRF540 (ST00) L
3639	212210102178	RST CRB CF1/6 A 47R PM5 A	5108	313818876471	FIL MAINS 16MH 1A2 163Y1R2	7264	932212802687	FET POW IRF540 (ST00) L
3640	212210102187	RST CRB CF1/6 A 680R PM5 A	5113	313818877961	TFM SMT LAYER HJC-S3113 WIRE	7266	932212802687	FET POW IRF540 (ST00) L
3641	213810113102	RST CRB CFR-12 A 1K PM5 A	5123	242253600039	IND FXD TSL0808 S 180U PM10 A	7501	935267455112	IC TDA4841PS/V3 (PHSE) L
3642	212010592139	RST MOX 1W RSS S 270R PM5 B	5124	242253600039	IND FXD TSL0808 S 180U PM10 A	7502	932209011673	TRA SIG BC548C (KECO) A
3643	212210102175	RST CRB CF1/6 A 10R PM5 A	5125	823827446521	IND FXD SP0406A 180U PM10 B	7503	932214472676	TRA SIG BF423 (KECO) A
3644	212211000418	RST MFLM MF1/2WS A 220K PM1 A	5126	823827446521	IND FXD SP0406A 180U PM10 B	7601	933953420676	TRA SIG TBC338-40 (TOSJ) A
3645	213810113104	RST CRB CFR-12 A 100K PM5 A	5127	242253597416	IND FXD SP0406 A 33U PM10 B	7602	933953410676	TRA SIG TBC328-40 (TOSJ) A
3646	212211000423	RST MFLM MF1/2WS A 330K PM1 A	5007	313818874661	COI DEGAUS 62-9703-15 D	7604	933953420676	TRA SIG TBC338-40 (TOSJ) A
3561	213836500076	RTRM CER LIN 10K H VG067TL1 B	6802	933256030673	DIO SIG 1N4148 A (VISH) A	7605	934003960126	FET SIG BSN254A (PHSE) A
3648	212211000442	RST MFLM MF1/2WS A 4M7 PM1 A	6820	933913910115	DIO SIG SM BAS32L (PHSE) R	7607	933567130126	TRA SIG BC517 (PHSE) A
3650	213810113222	RST CRB CFR-12 A 2K2 PM5 A	6821	933256030673	DIO SIG 1N4148 A (VISH) A	7608	933567120126	TRA SIG BC516 (PHSE) A
3652	213810113182	RST CRB CFR-12 A 1K8 PM5 A	6821	933256030673	DIO SIG 1N4148 A (VISH) A	7609	932206519687	TRA POW BUX87 (ST00) L
3653	213810113393	RST CRB CFR-12 A 39K PM5 A	6604	933751660673	DIO REC RGP10D A (VISH) A	7611	932210142676	TRA SIG BC558C (KECO) A
3654	213810113222	RST CRB CFR-12 A 2K2 PM5 A	6605	933751660673	DIO REC RGP10D A (VISH) A	7612	932209011673	TRA SIG BC548C (KECO) A
3655	212211000321	RST MFLM MF1/2WS A 22R PM1 A	6606	933497950673	DIO REC RGP10J A (VISH) A	7614	933953420676	TRA SIG TBC338-40 (TOSJ) A
3656	212211000321	RST MFLM MF1/2WS A 22R PM1 A	6607	933256030673	DIO SIG 1N4148 A (VISH) A	7615	932210142676	TRA SIG BC558C (KECO) A
3657	212210102201	RST CRB CF1/6 A 10K PM5 A	6608	933497950673	DIO REC RGP10J A (VISH) A	7617	932214469676	TRA SIG BF422 (KECO) A
3658	212210102201	RST CRB CF1/6 A 10K PM5 A	6609	933952580685	DIO SIG SM BAV103 (VISH) R	7621	933984890682	IC LM358N (ST00) L
3659	212210102187	RST CRB CF1/6 A 680R PM5 A	6610	933256030673	DIO SIG 1N4148 A (VISH) A	7622	932209011673	TRA SIG BC548C (KECO) A
3662	213810113473	RST CRB CFR-12 A 47K PM5 A	6611	933493960673	DIO REC RGP10G A (VISH) A	7682	933953410676	TRA SIG TBC328-40 (TOSJ) A
3663	213810113689	RST CRB CFR-12 A 68R PM5 A	6612	933751660673	DIO REC RGP10D A (VISH) A	7683	933953420676	TRA SIG TBC338-40 (TOSJ) A
3665	212210101458	RST CRB CF1/4 A 2K2 PM5 A	6614	933414680133	DIO REG BZX79-C2V4 A (PHSE) A	7685	934025870126	TRA SIG MPSA44 (PHSE) A
3666	213810113473	RST CRB CFR-12 A 47K PM5 A	6615	933256030673	DIO SIG 1N4148 A (VISH) A	7801	823827446321	CPU,IC (6148-K420PH-94A)
3682	213810113393	RST CRB CFR-12 A 39K PM5 A	6616	933189210133	DIO SIG BAV21 A (PHSE) A	7802	932210142676	TRA SIG BC558C (KECO) A
3683	213810113274	RST CRB CFR-12 A 270K PM5 A	6617	933189210133	DIO SIG BAV21 A (PHSE) A	1153	313817880201	VB ASSY (109B6)
3685	213810113114	RST CRB CFR-12 A 110K PM5 A	6621	933189210133	DIO SIG BAV21 A (PHSE) A	2307	223886115229	CER1 0805 NP0 50V 22P PM5 R
3687	212211000374	RST MFLM MF1/2WS A 4K7 PM1 A	6622	933497950673	DIO REC RGP10J A (VISH) A	2308	223891015649	CER2 0805 X7R 25V 100N PM10 R
3688	212211000367	RST MFLM MF1/2WS A 2K7 PM1 A	6603	932205787673	DIO REC EGP20G A (VISH) A	2309	223891015649	CER2 0805 X7R 25V 100N PM10 R
3690	213810113159	RST CRB CFR-12 A 15R PM5 A	6251	933497950673	DIO REC RGP10J A (VISH) A	2310	223886115229	CER1 0805 NP0 50V 22P PM5 R
3691	212210102201	RST CRB CF1/6 A 10K PM5 A	6252	933497950673	DIO REC RGP10J A (VISH) A	2311	223891015649	CER2 0805 X7R 25V 100N PM10 R
3692	213810113273	RST CRB CFR-12 A 27K PM5 A	6253	933497950673	DIO REC RGP10J A (VISH) A	2322	223858015636	CER2 0805 X7R 50V 10N PM10 R
3693	212210102202	RST CRB CF1/6 A 12K PM5 A	6255	933497950673	DIO REC RGP10J A (VISH) A	2323	223858015636	CER2 0805 X7R 50V 10N PM10 R
3694	212210102178	RST CRB CF1/6 A 47R PM5 A	6401	933957760673	DIO REC SB140 A (VISH) A	2324	203801750218	ELCAP REA 16V S 47U PM20 A
3695	212210102191	RST CRB CF1/6 A 1K5 PM5 A	6503	933256030673	DIO SIG 1N4148 A (VISH) A	2336	223891015649	CER2 0805 X7R 25V 100N PM10 R
3696	212211000325	RST MFLM MF1/2WS A 47R PM1 A	6511	933189210133	DIO SIG BAV21 A (PHSE) A	2337	223891015649	CER2 0805 X7R 25V 100N PM10 R
3699	212037900001	RTRM CER LIN 500K H VG067TL1 B	6512	933117750133	DIO REG BZX79-C6V8 A (PHSE) A	2338	223891015649	CER2 0805 X7R 25V 100N PM10 R
3811	212210102201	RST CRB CF1/6 A 10K PM5 A	6513	933256030673	DIO SIG 1N4148 A (VISH) A	2341	203803513203	ELCAP RGA 16V S 47U PM20 A
3812	213810113222	RST CRB CFR-12 A 2K2 PM5 A	6601	933189210133	DIO SIG BAV21 A (PHSE) A	2342	223891015649	CER2 0805 X7R 25V 100N PM10 R
3813	212210102197	RST CRB CF1/6 A 4K7 PM5 A	6602	933117830133	DIO REG BZX79-C15 A (PHSE) A	2353	223891015649	CER2 0805 X7R 25V 100N PM10 R
3814	213810113471	RST CRB CFR-12 A 470R PM5 A	6101	932205814682	BRIDGE GBU4K (VISH) Y	2354	223891015649	CER2 0805 X7R 25V 100N PM10 R
3815	232273061472	RST SM 0805 RC11 4K7 PM5 R	6103	933497950673	DIO REC RGP10J A (VISH) A	2356	203803521303	ELCAP GS 25V S 10U PM20 A
3816	212210102197	RST CRB CF1/6 A 4K7 PM5 A	6106	933751660673	DIO REC RGP10D A (VISH) A	2721	203803527703	ELCAP KM 100V S 22U PM20 A
3817	212210102205	RST CRB CF1/6 A 22K PM5 A	6107	933751660673	DIO REC RGP10D A (VISH) A	2722	225232626104	CER2 ML X7R 100V S 100N PM10 A
3818	212210102181	RST CRB CF1/6 A 100R PM5 A	6109	933256030673	DIO SIG 1N4148 A (VISH) A	2723	203803522801	ELCAP BP NK 160V S 1U PM20 A
3820	213810113224	RST CRB CFR-12 A 220K PM5 A	6113	933189210133	DIO SIG BAV21 A (PHSE) A	2724	203803513203	ELCAP RGA 16V S 47U PM20 A
3821	232273061472	RST SM 0805 RC11 4K7 PM5 R	6118	933256030673	DIO SIG 1N4148 A (VISH) A	2725	242254945382	SURGE PROTECT SGP-201M-DRF A
3822	232273061472	RST SM 0805 RC11 4K7 PM5 R	6131	933730980133	DIO REC BYV36C A (PHSE) A	2727	203803511701	ELCAP REA 100V S 1U PM20 A
3823	232273061472	RST SM 0805 RC11 4K7 PM5 R	6132	933117770133	DIO REG BZX79-C8V2 A (PHSE) A	2729	203803521702	ELCAP GS 100V S 10U PM20 A
3824	212210102181	RST CRB CF1/6 A 100R PM5 A	6133	933730980133	DIO REC BYV36C A (PHSE) A	2730	203801750218	ELCAP REA 16V S 47U PM20 A
3843	212210102201	RST CRB CF1/6 A 10K PM5 A	6134	933957760673	DIO REC SB140 A (VISH) A	2731	203803522801	ELCAP BP NK 160V S 1U PM20 A
3844	232273061472	RST SM 0805 RC11 4K7 PM5 R	6135	932210346673	DIO REC SBYV27-200 A (VISH) A	2732	203803511701	ELCAP REA 100V S 1U PM20 A
3847	232273061472	RST SM 0805 RC11 4K7 PM5 R	6136	933751660673	DIO REC RGP10D A (VISH) A	2733	242254945382	SURGE PROTECT SGP-201M-DRF A
3848	212210102201	RST CRB CF1/6 A 10K PM5 A	6140	933256030673	DIO SIG 1N4148 A (VISH) A	2751	203803522801	ELCAP BP NK 160V S 1U PM20 A
3851	212210102201	RST CRB CF1/6 A 10K PM5 A	6141	933751660673	DIO REC RGP10D A (VISH) A	2752	203803511701	ELCAP REA 100V S 1U PM20 A
3852	232273061683	RST SM 0805 RC11 68K PM5 R						
3853	212210102201	RST CRB CF1/6 A 10K PM5 A						
3854	232273061334	RST SM 0805 RC11 330K PM5 R						
3855	212210102194	RST CRB CF1/6 A 2K7 PM5 A						



2753	242254945382	SURGE PROTECT SGP-201M-DRF	3759	213810113689	RST CRB CFR-12 A 68R PM5 A
2760	225256108406	CER1 DC SL 1KV S 47P PM10 A	3761	212210102175	RST CRB CF1/6 A 10R PM5 A
2761	203801750218	ELCAP REA 16V S 47U PM20 A	3762	232273061103	RST SM 0805 RC11 10K PM5 R
2762	223891015649	CER2 0805 X7R 25V 100N PM10 R	3763	212210102181	RST CRB CF1/6 A 100R PM5 A
2771	223891015649	CER2 0805 X7R 25V 100N PM10 R	3771	212211000361	RST MFLM MF1/2WS A 1K5 PM1 A
2772	202055790146	CER2 DC B 500V S 470P PM10 A	3772	212211000387	RST MFLM MF1/2WS A 15K PM1 A
2776	223891015649	CER2 0805 X7R 25V 100N PM10 R	3778	213810113102	RST CRB CFR-12 A 1K PM5 A
2778	203803513203	ELCAP RGA 16V S 47U PM20 A			
2779	223891015649	CER2 0805 X7R 25V 100N PM10 R	5301	242253597608	IND FXD SPT0305 A 1U8 PM10 R
2781	223891015649	CER2 0805 X7R 25V 100N PM10 R	5303	313816872621	BEAD COIL (BF30TA-2.5X3X1B)
2782	203830250095	CAP MPOL 100V S 100N PM10 A	5307	242253597608	IND FXD SPT0305 A 1U8 PM10 R
2783	202055890649	CER2 DC B 2KV S 2N2 PM10 B	5702	242253597608	IND FXD SPT0305 A 1U8 PM10 R
2784	225256214406	CER1 DC SL 2KV S 47P PM10 A	5703	313816872631	BEAD COIL
2787	223891015649	CER2 0805 X7R 25V 100N PM10 R	5704	242253597076	IND FXD SP0305 A 15U PM10 B
2312	223891015649	CER2 0805 X7R 25V 100N PM10 R	5705	242253597608	IND FXD SPT0305 A 1U8 PM10 R
			5721	242253597064	IND FXD SP0305 A 0U33 PM20 B
3647	213810113228	RST CRB CFR-12 A 2R2 PM5 A	5751	242253597064	IND FXD SP0305 A 0U33 PM20 B
3301	213810113759	RST CRB CFR-12 A 75R PM5 A	5752	242253597064	IND FXD SP0305 A 0U33 PM20 B
3302	213810113759	RST CRB CFR-12 A 75R PM5 A	5771	243853598058	IND FXD BEAD EMI 100MHZ 80R A
3303	213810113759	RST CRB CFR-12 A 75R PM5 A	5778	313816872631	BEAD COIL
3304	212210102178	RST CRB CF1/6 A 47R PM5 A	5779	242253597608	IND FXD SPT0305 A 1U8 PM10 R
3305	212210102197	RST CRB CF1/6 A 4K7 PM5 A			
3306	212210102197	RST CRB CF1/6 A 4K7 PM5 A	6301	933117810133	DIO REG BZX79-C12 A (PHSE) A
3307	212210102181	RST CRB CF1/6 A 100R PM5 A	6302	933117810133	DIO REG BZX79-C12 A (PHSE) A
3308	212210102181	RST CRB CF1/6 A 100R PM5 A	6303	933117810133	DIO REG BZX79-C12 A (PHSE) A
3309	232273061102	RST SM 0805 RC11 1K PM5 R	6721	933189210133	DIO SIG BAV21 A (PHSE) A
3310	232273061102	RST SM 0805 RC11 1K PM5 R	6722	933189210133	DIO SIG BAV21 A (PHSE) A
3311	232273061102	RST SM 0805 RC11 1K PM5 R	6731	933189210133	DIO SIG BAV21 A (PHSE) A
3312	213810113689	RST CRB CFR-12 A 68R PM5 A	6732	933189210133	DIO SIG BAV21 A (PHSE) A
3313	213810113689	RST CRB CFR-12 A 68R PM5 A	6751	933189210133	DIO SIG BAV21 A (PHSE) A
3314	213810113689	RST CRB CFR-12 A 68R PM5 A	6752	933189210133	DIO SIG BAV21 A (PHSE) A
3315	212210102178	RST CRB CF1/6 A 47R PM5 A	6771	933751660673	DIO REC RGP10D A (VISH) A
3316	212210102181	RST CRB CF1/6 A 100R PM5 A	6772	933117810133	DIO REG BZX79-C12 A (PHSE) A
3317	212210102205	RST CRB CF1/6 A 22K PM5 A	6773	933256030673	DIO SIG 1N4148 A (VISH) A
3318	232273061102	RST SM 0805 RC11 1K PM5 R	6774	933189210133	DIO SIG BAV21 A (PHSE) A
3319	232273061101	RST SM 0805 RC11 100R PM5 R			
3323	213810113473	RST CRB CFR-12 A 47K PM5 A	7301	935264061112	IC TDA4887PS/V1 (PHSE) L
3324	232273061822	RST SM 0805 RC11 8K2 PM5 R	7302	935270542112	IC TDA4823PS/V1 (PHSE) L
3325	213810113473	RST CRB CFR-12 A 47K PM5 A	7303	932210611676	IC LE33CZ (ST00) A
3326	213810113471	RST CRB CFR-12 A 470R PM5 A	7304	932218565682	IC NT68275-00031 (NOVA) L
3327	232273061562	RST SM 0805 RC11 5K6 PM5 R	7305	932209011673	TRA SIG BC548C (KECO) A
3328	232273061332	RST SM 0805 RC11 3K3 PM5 R	7701	932214602667	IC LM2435T (NSC0) L
3329	232273061562	RST SM 0805 RC11 5K6 PM5 R	7721	932209011673	TRA SIG BC548C (KECO) A
3330	232273061105	RST SM 0805 RC11 1M PM5 R	7722	932214469676	TRA SIG BF422 (KECO) A
3334	212210102178	RST CRB CF1/6 A 47R PM5 A	7731	932209011673	TRA SIG BC548C (KECO) A
3361	212210102181	RST CRB CF1/6 A 100R PM5 A	7732	932214469676	TRA SIG BF422 (KECO) A
3363	232273061101	RST SM 0805 RC11 100R PM5 R	7751	932209011673	TRA SIG BC548C (KECO) A
3367	212210102174	RST CRB CF1/6 A 4R7 PM5 A	7752	932214469676	TRA SIG BF422 (KECO) A
3376	232273061689	RST SM 0805 RC11 68R PM5 R			
3378	213810113689	RST CRB CFR-12 A 68R PM5 A	1154	313817880191	C/B ASSY (109B6)
3381	232273061689	RST SM 0805 RC11 68R PM5 R	1891	243812800196	SWI TACT H=5 GY 160G SKHHAM B
3383	212210102181	RST CRB CF1/6 A 100R PM5 A	1892	243812800196	SWI TACT H=5 GY 160G SKHHAM B
3385	232273061478	RST SM 0805 RC11 4R7 PM5 R	1893	243812800196	SWI TACT H=5 GY 160G SKHHAM B
3706	212210102178	RST CRB CF1/6 A 47R PM5 A	1895	243812800196	SWI TACT H=5 GY 160G SKHHAM B
3707	212210102181	RST CRB CF1/6 A 100R PM5 A	3891	212211000385	RST MFLM MF1/2WS A 12K PM1 A
3716	212211000387	RST MFLM MF1/2WS A 15K PM1 A	3892	212211000389	RST MFLM MF1/2WS A 18K PM1 A
3718	212211000387	RST MFLM MF1/2WS A 15K PM1 A	3893	212211000401	RST MFLM MF1/2WS A 47K PM1 A
3719	212211000387	RST MFLM MF1/2WS A 15K PM1 A	6891	932218424682	LED VS L-34GD (KIEL) B
3721	232273061471	RST SM 0805 RC11 470R PM5 R	<b>Diversity of 109B60(CPT) Comparing with 109B60/00(LG)</b>		
3722	232273061122	RST SM 0805 RC11 1K2 PM5 R	1151	823827446341	CRT M46AJS53X46(SMV)
3723	232273061224	RST SM 0805 RC11 220K PM5 R	1152	313817869911	MB-2 ASSY (CPT-109B6)
3724	232273061223	RST SM 0805 RC11 22K PM5 R	2257	203830100225	CAP MPP MPS 250V S 270N PM5 B
3725	232273061683	RST SM 0805 RC11 68K PM5 R	2262	203830100223	CAP MPP MPS 250V S 150N PM5 B
3726	213810113105	RST CRB CFR-12 A 1M PM5 A	8899	313818877841	CBLE330933 4/3/4-853T AWG26
3727	212210102178	RST CRB CF1/6 A 47R PM5 A	<b>Diversity of 109B60(SDI) Comparing with 109B60/00(LG)</b>		
3728	213811273151	RST CRB CFR-25 A 150R PM5 A	1151	823827446351	CRT M46QCK761X214(TCO/DFT-M)
3729	232273061689	RST SM 0805 RC11 68R PM5 R	1152	313817880181	MB-3 ASSY (SDI-109B6)
3731	213811273151	RST CRB CFR-25 A 150R PM5 A	1255	313817880961	EEPROM ASSY (SDI-109B6)
3732	232273061479	RST SM 0805 RC11 47R PM5 R	0213	313811580861	LABEL-EEPROM(SDI)
3733	213810113471	RST CRB CFR-12 A 470R PM5 A	2255	203830100302	CAP PP PPN 250V S 200N PM5 B
3734	213810113105	RST CRB CFR-12 A 1M PM5 A	2621	202055790642	CER2 DC B 500V S 1N8 PM10 A
3735	232273061122	RST SM 0805 RC11 1K2 PM5 R	3530	213810113361	RST CRB CFR-12 A 360R PM5 A
3736	232273061224	RST SM 0805 RC11 220K PM5 R	3128	213810113364	RST CRB CFR-12 A 360K PM5 A
3737	212210102212	RST CRB CF1/6 A 68K PM5 A			
3738	232273061223	RST SM 0805 RC11 22K PM5 R			
3739	232273061829	RST SM 0805 RC11 82R PM5 R			
3751	232273061471	RST SM 0805 RC11 470R PM5 R			
3752	213810113105	RST CRB CFR-12 A 1M PM5 A			
3753	232273061122	RST SM 0805 RC11 1K2 PM5 R			
3754	232273061224	RST SM 0805 RC11 220K PM5 R			
3755	232273061683	RST SM 0805 RC11 68K PM5 R			
3756	232273061223	RST SM 0805 RC11 22K PM5 R			
3757	212210102178	RST CRB CF1/6 A 47R PM5 A			
3758	213811273151	RST CRB CFR-25 A 150R PM5 A			

## Recommended Parts List

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0001	313812755171	FRONT CABINET ASSY		6147	933117760133	DIO REG BZX79-C7V5 A (PHSE) A	
0004	313812753821	CHIN ASSY		6148	933913910115	DIO SIG SM BAS32L (PHSE) R	
0042	313810460801	BACK COVER		6600	932216961687	DIO REC DMV1500M (ST00) L	
0003	313812753812	PEDESTAL ASSY		7102	935267356112	IC TEA1507P/N1 (PHSE) L	
0057	313810440571	HOUSING COVER		7103	933953420676	TRA SIG TBC338-40 (TOSJ) A	
0450	313810663701	CARTON		7111	932214014667	OPT CP TCET1103(G) (VISH) L	
0451	313810662921	CUSHION - TOP		7112	932208697676	IC TL431ACZ S (ST00) A	
0452	313810662931	CUSHION - BTM		7113	933953420676	TRA SIG TBC338-40 (TOSJ) A	
0454	313810656651	PE BAG		7114	932208234676	IC L78L05ACZ (ST00) A	
6301	933117810133	DIO REG BZX79-C12 A (PHSE) A		7115	933826850126	THYRIS BT169B (PHSE) A	
6302	933117810133	DIO REG BZX79-C12 A (PHSE) A		7116	932209011673	TRA SIG BC548C (KECO) A	
6303	933117810133	DIO REG BZX79-C12 A (PHSE) A		7101	932215891687	FET POW STP6NC60 (ST00) L	
6721	933189210133	DIO SIG BAV21 A (PHSE) A		7603	932218832687	FET POW FQP6P25 (FSC0) L	
6722	933189210133	DIO SIG BAV21 A (PHSE) A		7606	932221100682	TRA POW 2SC5856 (TOSJ) Y	
6731	933189210133	DIO SIG BAV21 A (PHSE) A		7613	931101033687	TRA POW TIP122 (ONSE) L	
6732	933189210133	DIO SIG BAV21 A (PHSE) A		7401	933922940682	IC TDA8172 (ST00) L	
6751	933189210133	DIO SIG BAV21 A (PHSE) A		7803	932218650682	IC AT24C16A-10PI-2.7 (ATME) L	
6752	933189210133	DIO SIG BAV21 A (PHSE) A		7251	932209011673	TRA SIG BC548C (KECO) A	
6771	933751660673	DIO REC RGP10D A (VISH) A		7252	932209011673	TRA SIG BC548C (KECO) A	
6772	933117810133	DIO REG BZX79-C12 A (PHSE) A		7253	932209011673	TRA SIG BC548C (KECO) A	
6773	933256030673	DIO SIG 1N4148 A (VISH) A		7254	932209011673	TRA SIG BC548C (KECO) A	
6774	933189210133	DIO SIG BAV21 A (PHSE) A		7256	932209011673	TRA SIG BC548C (KECO) A	
7301	935264061112	IC TDA4887PS/V1 (PHSE) L		7262	932212802687	FET POW IRF540 (ST00) L	
7302	935270542112	IC TDA4823PS/V1 (PHSE) L		7263	932212802687	FET POW IRF540 (ST00) L	
7303	932210611676	IC LE33CZ (ST00) A		7264	932212802687	FET POW IRF540 (ST00) L	
7304	932218565682	IC NT68275-00031 (NOVA) L		7266	932212802687	FET POW IRF540 (ST00) L	
7305	932209011673	TRA SIG BC548C (KECO) A		7501	935267455112	IC TDA4841PS/V3 (PHSE) L	
7701	932214602667	IC LM2435T (NSCO) L		7502	932209011673	TRA SIG BC548C (KECO) A	
7721	932209011673	TRA SIG BC548C (KECO) A		7503	932214472676	TRA SIG BF423 (KECO) A	
7722	932214469676	TRA SIG BF422 (KECO) A		7601	933953420676	TRA SIG TBC338-40 (TOSJ) A	
7723	932209011673	TRA SIG BC548C (KECO) A		7602	933953410676	TRA SIG TBC328-40 (TOSJ) A	
7732	932214469676	TRA SIG BF422 (KECO) A		7604	933953420676	TRA SIG TBC338-40 (TOSJ) A	
7751	932209011673	TRA SIG BC548C (KECO) A		7605	934003960126	FET SIG BSN254A (PHSE) A	
7752	932214469676	TRA SIG BF422 (KECO) A		7607	933567130126	TRA SIG BC517 (PHSE) A	
6802	933256030673	DIO SIG 1N4148 A (VISH) A		7608	933567120126	TRA SIG BC516 (PHSE) A	
6820	933913910115	DIO SIG SM BAS32L (PHSE) R		7609	932206519687	TRA POW BUX87 (ST00) L	
6821	933256030673	DIO SIG 1N4148 A (VISH) A		7611	932210142676	TRA SIG BC558C (KECO) A	
6604	933751660673	DIO REC RGP10D A (VISH) A		7612	932209011673	TRA SIG BC548C (KECO) A	
6605	933751660673	DIO REC RGP10D A (VISH) A		7614	933953420676	TRA SIG TBC338-40 (TOSJ) A	
6606	933497950673	DIO REC RGP10J A (VISH) A		7615	932210142676	TRA SIG BC558C (KECO) A	
6607	933256030673	DIO SIG 1N4148 A (VISH) A		7617	932214469676	TRA SIG BF422 (KECO) A	
6608	933497950673	DIO REC RGP10J A (VISH) A		7621	933984890682	IC LM358N (ST00) L	
6609	933952580685	DIO SIG SM BAV103 (VISH) R		7622	932209011673	TRA SIG BC548C (KECO) A	
6610	933256030673	DIO SIG 1N4148 A (VISH) A		7682	933953410676	TRA SIG TBC328-40 (TOSJ) A	
6611	933493960673	DIO REC RGP10G A (VISH) A		7683	933953420676	TRA SIG TBC338-40 (TOSJ) A	
6612	933751660673	DIO REC RGP10D A (VISH) A		7685	934025870126	TRA SIG MPSA44 (PHSE) A	
6614	933414680133	DIO REG BZX79-C2V4 A (PHSE) A		7801	823827446321	CPU,IC (6148-K420PH-94A)	
6615	933256030673	DIO SIG 1N4148 A (VISH) A		7802	932210142676	TRA SIG BC558C (KECO) A	
6616	933189210133	DIO SIG BAV21 A (PHSE) A					
6617	933189210133	DIO SIG BAV21 A (PHSE) A					
6618	933117770133	DIO REG BZX79-C8V2 A (PHSE) A					
6621	933189210133	DIO SIG BAV21 A (PHSE) A					
6622	933497950673	DIO REC RGP10J A (VISH) A					
6603	932205787673	DIO REC EGP20G A (VISH) A					
6251	933497950673	DIO REC RGP10J A (VISH) A					
6252	933497950673	DIO REC RGP10J A (VISH) A					
6253	933497950673	DIO REC RGP10J A (VISH) A					
6255	933497950673	DIO REC RGP10J A (VISH) A					
6401	933957760673	DIO REC SB140 A (VISH) A					
6503	933256030673	DIO SIG 1N4148 A (VISH) A					
6511	933189210133	DIO SIG BAV21 A (PHSE) A					
6512	933117750133	DIO REG BZX79-C6V8 A (PHSE) A					
6513	933256030673	DIO SIG 1N4148 A (VISH) A					
6601	933189210133	DIO SIG BAV21 A (PHSE) A					
6602	933117830133	DIO REG BZX79-C15 A (PHSE) A					
6101	932205814682	BRIDGE GBU4K (VISH) Y					
6103	933497950673	DIO REC RGP10J A (VISH) A					
6106	933751660673	DIO REC RGP10D A (VISH) A					
6107	933751660673	DIO REC RGP10D A (VISH) A					
6109	933256030673	DIO SIG 1N4148 A (VISH) A					
6113	933189210133	DIO SIG BAV21 A (PHSE) A					
6118	933256030673	DIO SIG 1N4148 A (VISH) A					
6131	933730980133	DIO REC BYV36C A (PHSE) A					
6132	933117770133	DIO REG BZX79-C8V2 A (PHSE) A					
6133	933730980133	DIO REC BYV36C A (PHSE) A					
6134	933957760673	DIO REC SB140 A (VISH) A					
6135	932210346673	DIO REC SBYV27-200 A (VISH) A					
6136	933751660673	DIO REC RGP10D A (VISH) A					
6140	933256030673	DIO SIG 1N4148 A (VISH) A					
6141	933751660673	DIO REC RGP10D A (VISH) A					
6143	933256030673	DIO SIG 1N4148 A (VISH) A					
6144	933497950673	DIO REC RGP10J A (VISH) A					
6146	933256030673	DIO SIG 1N4148 A (VISH) A					

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### V40 109B6 19" 97kHz model General Specification (Sheet 590)

#### FEATURES / BENEFITS

- Extremely high MTBF (over 75K Hours, exclude. CRT).
- User friendly OSD display for mode identification and adjustment
- Professional look, with non-flammable cabinet (94V-0).
- Better display performance.
  - . Flat/square display tube
  - . Finer CRT dot pitch
  - . Full screen size application
  - . Real multi-freq.
- Power saving management system.
- VESA DDC2B
- Picture tilt control
- Low emission MPRII/TCO

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## 1.0 Introduction

This document is related to the 19" AUTOSCAN color monitor  
and max. resolution: 1920 x 1440 by 60Hz refresh rate

## 2.0 General description

This AUTOSCAN analog color monitor is specified as a  
display peripheral within an IBM compatible PC.

The AUTOSCAN analog color monitor is to operate at  
H: 30 to 97.0 kHz V: 50 to 160 Hz  
can be applied to all RGB analog computers within this scanning frequencies.

The AUTOSCAN analog color monitor is intended to be a  
finished product, basically a display device mounted inside  
a plastic enclosure which provides the aesthetic, mechanical,  
ergonomic and safety requirements.

## 2.1 General condition

The unit will produce a usable image after switching-on,  
measurements are to be carried out with a full stabilization  
set after about 30 minutes warm-up at room ambient  
temp. of 25°C.

Repetitive power on/off cycles are allowed though should  
be avoided within 4 sec.

## 3.0 Electrical characteristics

### 3.1 Signal interface

This AUTOSCAN analog color display has an analog video  
interface to operates at a multi-frequencies timing in  
several display modes.

#### 3.1.1 Input requirements

##### A. Input signals

Video - 0.7 Vp-p 75 ohms (for individual of R,G and B  
signals must not deviate 0.015 Vp-p from each  
other for balance of white pattern)

##### Sync - TTL level

(between 0 and 0.6 V to be considered as low  
level, between 2.3 and 5.0 V as high level)

##### B. Impedance

Video - Terminated with 75 ohms

Sync - Terminated with 4.7K ohms pull-down resistors.

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## 3.1.2 Signals input

The input video signals are applied to the display device through a video cable which is fixed to the monitor (flying cable length 1.8M).

Video input cable:  
15 pin **D-Sub** connector type with pin assignment as follows:

Pin assignment of 15P D-SUB connector

Pin No.	Assignment
P 1	Red video input
P 2	Green video input
P 3	Blue video input
P 4	Ground
P 5	Self-test
P 6	Red video ground
P 7	Green video ground
P 8	Blue video ground
P 9	Not connect
P10	Ground
P11	Ground
P12	Bi-directional data (SDA)
P13	H SYNC
P14	V SYNC
P15	DDC Data CLOCK (SCL)

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## 3.1.3 Factory modes: 40 modes

 Preset mode : 13  
 User modes: 16

Item	Resolution	Freq. V x H	Pixel rate(Mhz)	Remark
1	640x480	60(31.469k)	25.175	VGA
2		72(37.861k)	31.500	VESA
3		75(37.500k)	31.500	VESA
4 @		85(43.269k)	36.000	VESA
5		100(50.60k)	40.500	SNI
6		67(35.0k)	30.240	MAC - II
7	640x350	70(31.5k)	25.100	VGA
8		85(37.8k)	31.500	VESA
9 @	720x400	70(31.469k)	28.321	VGA
10		85(37.927k)	35.500	VESA
11	800x600	60(37.879k)	40.000	VESA
12		72(48.077k)	50.000	VESA
13		75(46.875k)	49.500	VESA
14 @		85(53.674k)	56.250	VESA
15		100(63.90k)	67.500	SNI
16		56(35.16k)	36.000	VESA
17		90(60.4k)	65.227	SIEMENS
18		832x624	75(49.725k)	MAC - II
19 @	1024x768	60(48.363k)	65.000	VESA
20 @		70(56.476k)	75.000	VESA
21		75(60.000k)	78.750	VESA
22 @		85(68.677k)	94.500	VESA
23 @		90(72.54K)	99.82	SIEMENS
24 @	1152x864	70(63.850K)	94.500	VESA
25		75(67.500k)	108.000	VESA
26		85(77.090K)	121.500	VESA
27	1152x870	75(68.681k)	100.000	MAC
28	1152x900	76(71.800k)	108.000	SUN
29	1280x960	60(60.000k)	108.000	VESA
30 @		85(85.938k)	148.500	VESA
31	1280x1024	60(63.981k)	108.000	VESA
32 @		75(79.976k)	135.000	VESA
33 @		85(91.146k)	157.500	VESA
34	1600x1200	60(75.000k)	162.000	VESA
35		65(81.250k)	175.500	VESA
36 @		70(87.500k)	189.000	VESA
37 @		75(93.75k)	202.50	VESA
38	1792x1344	60(83.640k)	204.750	VESA/P
39	1856x1392	60(86.330k)	218.250	VESA/P
40	1920x1440	60(90.000k)	234.000	VESA/P

" @ "Denote it is a preset mode ,others are preload modes.

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## 3.2 Timing requirements

The pre-set timing table are shown as below  
Timing Table: 1- 13

TIMING FOR V40 109B6 97KHz model AUTOSCAN COLOR MONITOR

REFERENCE PATTERN GENERATOR: CHROMA 2225

TABLE 1: 31.469 KHz/70.087Hz, 720 X 400, pixel=28.325 MHz

<u>Horizontal</u>		<u>Vertical</u>	
Frame border	= 0	Frame border	= 0
Total size	= 31.774 $\mu$ s	Total size	= 14.268 ms
Display size	= 25.422 $\mu$ s	Display size	= 12.711 ms
Rear porch	= 1.907 $\mu$ s	Rear porch	= 1.112 ms
Sync width	= 3.813 $\mu$ s	Sync width	= 0.064 ms
Sync polarity	= -	Sync polarity	= +

TABLE 2: 43.2 KHz/85Hz, 640 X 480, pixel=36.0 MHz

<u>Horizontal</u>		<u>Vertical</u>	
Frame borde	= 0	Frame border	= 0
Total size	= 23.111 $\mu$ s	Total size	= 11.763 ms
Display size	= 17.778 $\mu$ s	Display size	= 11.093 ms
Rear porch	= 2.222 $\mu$ s	Rear porch	= 0.578 ms
Sync width	= 1.556 $\mu$ s	Sync width	= 0.069 ms
Sync polarity	= -	Sync polarity	= -

TABLE 3: 48.30 KHz/60.0Hz, 1024 X 768, pixel=65.0 MHz

<u>Horizontal</u>		<u>Vertical</u>	
Frame borde	= 0	Frame border	= 0
Total size	= 20.677 $\mu$ s	Total size	= 16.666 ms
Display size	= 15.754 $\mu$ s	Display size	= 15.880 ms
Rear porch	= 2.462 $\mu$ s	Rear porch	= 0.60 ms
Sync width	= 2.092 $\mu$ s	Sync width	= 0.124 ms
Sync polarity	= -	Sync polarity	= -

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TABLE 4: 53.674KHz/85.061Hz, 800 X 600, pixel=56.250MHz

<u>Horizontal</u>		<u>Vertical</u>	
Frame border	= 0	Frame border	= 0
Total size	= 18.631 us	Total size	= 11.756 ms
Display size	= 14.222 us	Display size	= 11.179 ms
Rear porch	= 2.702 us	Rear porch	= 0.503 ms
Sync width	= 1.138 us	Sync width	= 0.056 ms
Sync polarity	= +	Sync polarity	= +

TABLE 5: 56.48 KHz/70.0Hz, 1024 X 768, pixel=75.0 MHz

<u>Horizontal</u>		<u>Vertical</u>	
Frame borde	= 0	Frame border	= 0
Total size	= 17.707 $\mu$ s	Total size	= 14.272 ms
Display size	= 13.653 $\mu$ s	Display size	= 13.599 ms
Rear porch	= 1.920 $\mu$ s	Rear porch	= 0.513 ms
Sync width	= 1.813 $\mu$ s	Sync width	= 0.106 ms
Sync polarity	= -	Sync polarity	= -

TABLE 6: 63.85 KHz/70.0Hz, 1152 X 864, pixel=94.5 MHz

<u>Horizontal</u>		<u>Vertical</u>	
Frame borde	= 0	Frame border	= 0
Total size	= 15.661 $\mu$ s	Total size	= 14.283 ms
Display size	= 12.190 $\mu$ s	Display size	= 13.531 ms
Rear porch	= 1.116 $\mu$ s	Rear porch	= 0.689 ms
Sync width	= 1.016 $\mu$ s	Sync width	= 0.047 ms
Sync polarity	= +	Sync polarity	= +

TABLE 7: 68.677KHz/84.997Hz, 1024 X 768, pixel=94.500 MHz

<u>Horizontal</u>		<u>Vertical</u>	
Frame border	= 0	Frame border	= 0
Total size	= 14.561 us	Total size	= 11.765 ms
Display size	= 10.836 us	Display size	= 11.183 ms
Rear porch	= 2.201 us	Rear porch	= 0.524 ms
Sync width	= 1.016 us	Sync width	= 0.044 ms
Sync polarity	= +	Sync polarity	= +

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TABLE 8: 72.544KHz/90.0Hz, 1024 X 768, pixel=99.82MHz

Horizontal		Vertical	
Frame border	= 0	Frame border	= 0
Total size	= 13.785 us	Total size	= 11.111 ms
Display size	= 10.258 us	Display size	= 10.587 ms
Rear porch	= 2.164 us	Rear porch	= 0.469 ms
Sync width	= 0.962 us	Sync width	= 0.041 ms
Sync polarity	= +	Sync polarity	= +

TABLE 9: 79.976KHz/75.0Hz, 1280 X 1024, pixel=135.00MHz

Horizontal		Vertical	
Frame border	= 0	Frame border	= 0
Total size	= 12.504 us	Total size	= 13.329 ms
Display size	= 9.481 us	Display size	= 12.804 ms
Rear porch	= 1.837 us	Rear porch	= 0.475 ms
Sync width	= 1.067 us	Sync width	= 0.038 ms
Sync polarity	= +	Sync polarity	= +

TABLE 10: 85.90 KHz/85Hz, 1280 X 960, pixel=148.5 MHz

Horizontal		Vertical	
Frame border	= 0	Frame border	= 0
Total size	= 11.636 $\mu$ s	Total size	= 11.764 ms
Display size	= 8.620 $\mu$ s	Display size	= 11.171 ms
Rear porch	= 1.508 $\mu$ s	Rear porch	= 0.547 ms
Sync width	= 1.077 $\mu$ s	Sync width	= 0.035 ms
Sync polarity	= +	Sync polarity	= +

TABLE 11: 87.50 KHz/70Hz, 1600 X 1200, pixel=189 MHz

Horizontal		Vertical	
Frame border	= 0	Frame border	= 0
Total size	= 11.429 $\mu$ s	Total size	= 14.286 ms
Display size	= 8.466 $\mu$ s	Display size	= 13.715 ms
Rear porch	= 1.608 $\mu$ s	Rear porch	= 0.526 ms
Sync width	= 1.016 $\mu$ s	Sync width	= 0.034 ms
Sync polarity	= +	Sync polarity	= +

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TABLE 12: 91.146KHz/85.024Hz, 1280 X 1024, pixel=157.500 MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	10.971 $\mu$ s	Total size	=	11.761 ms
Display size	=	8.127 $\mu$ s	Display size	=	11.234 ms
Rear porch	=	1.422 $\mu$ s	Rear porch	=	0.483 ms
Sync width	=	1.016 $\mu$ s	Sync width	=	0.033 ms
Sync polarity	=	+	Sync polarity	=	+

TABLE 13: 93.75 KHz/75Hz, 1600 X 120, pixel=202.5 MHz

Horizontal			Vertical		
Frame border	=	0	Frame border	=	0
Total size	=	10.667 $\mu$ s	Total size	=	13.334 ms
Display size	=	7.901 $\mu$ s	Display size	=	12.800 ms
Rear porch	=	1.501 $\mu$ s	Rear porch	=	0.491 ms
Sync width	=	0.948 $\mu$ s	Sync width	=	0.032 ms
Sync polarity	=	+	Sync polarity	=	+

## 3.2.1 Horizontal scanning

Scanning frequency	: 30 - 97.0 KHz,
H-shift range	: 10 mm Min.
Retrace time	: Less than 2.40 $\mu$ s.

## 3.2.2 Vertical scanning

Scanning frequency	: 50 - 160 Hz
V-shift range	: 8 mm Min.

## 3.3 Power supply

The display device maintains the specified performance in the range described as below :

Type	Mains current	Mains Voltage	Mains freq.
	1.1A max.	90 - 264 VAC	47-63Hz

Power consumption	: 70W (Typical)
Power cord length	: 1.8M
Power cord type	: 3 leads detachable power cord with protective earth plug .

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## 3.4 Power saving management system (at 220V +/- 20V mains)

MODE	SIGNAL			POWER	RECOVERY TIME
	H-SYNC	V-SYNC	VIDEO		
ON	ACTIVE	ACTIVE	ACTIVE	< 75W	NA
OFF	INACTIVE	ACTIVE	BLANKED	< 1W	~ 7 SEC.
OFF	ACTIVE	INACTIVE	BLANKED	< 1W	~ 7 SEC.
OFF	INACTIVE	INACTIVE	BLANKED	< 1W	~ 7 SEC

## 3.5 CRT description

This display unit employs a high resolution CRT complying with the following specifications :

Dimensions	: 19 inches , Flat square screen.
Diagonal VIS	: 18 inches
Dot Pitch	: 0.25mm / CPT; 0.25mm / LG , 0.25mm / SDI
Horizontal pitch	: 0.21mm / CPT; 0.21mm / LG , 0.21mm / SDI
Deflection angle	: 90 degrees
Source	: CPT / LG / SDI
Dynamic focus	: Yes (H+V)
Magnetic field	: North
Visible screen area	: 360 mm x 270 mm

## 3.6 RGB Amplifier

## 3.6.1 Video amplifiers

Max dot rate	: 234 MHz
Rise / Fall time	: < 6.5ns / < 6.5ns
Over / undershoot	: 15% Max.
	(Transient response)
Sag (background uniformity)	: 5% Max. (pulses of 0.70H)

## 3.6.2 Brightness and contrast

Reference mode 68.7K/85Hz full white pattern.

Brightness	Contrast	Light output (full white)	Light output (10cm x10cm block)
Minimum	Minimum	< 0.2 FL	
Centre	Maximum	30 +/- 2.5 FL	41 +/- 3 FL

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3.6.3 sRGB: When sRGB is selected, the light output (Full white pattern) will be  $23 \pm 2.5$  FL regardless of contrast and brightness controls. Adjusting contrast or brightness will auto exit sRGB setting and go to 6500K.

### 3.7 Variation of image size after warm-up 30 minutes.

Due to brightness change

from 3 to 32 FL (Max.) : < 1.0 %

Due to aging

(0 to 40 °C) : < 1.0 %

Due to mains voltage

variation : < 1.0 %

### 3.8 Degaussing

An automatic degaussing circuit is provided which requires no intervention. The degaussing activated at the time of switch-on or switch-on again or pressing manual degaussing key after switching-off degaussing circuits for longer than 30 minutes.

### 3.9 Phosphor protection

The display device is sufficiently protected against the burning of phosphors in case of repetitive power cycling or absence of horizontal deflection.

### 3.10 Low emission requirements

Items	Band I ELF (rms)	Band II VLF (rms)
Alternating Electric Field	MPR-II $\leq 25$ V/M TCO $\leq 10$	MPR-II $\leq 2.5$ V/M TCO $\leq 1.0$
Magnetic Field	MPR-II $\leq 250$ nT TCO $\leq 200$ nT	MPR-II $\leq 25$ nT TCO $\leq 25$ nT
E.S.P	$\leq \pm 500$ V	

Band I : 5 to 2K Hz.

Band II : 2K to 400K Hz.

Test procedure according to Low emission test method.

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### 3.11 Display data channel : DDC2B (VESA STANDARD)

The software DDC HEX Data should be written into EEPROM A0 page.

	DDC1	DDC2B
Software		V
Hardware		

#### 4.0 Display image (CRT facing east)

The monitor is aligned in a magnetic cage having the following magnetic field components :

Northern Hemisphere:  $H = 0$ ,  $V = +0.43 \pm 0.05G$ ,  $Z = 0$

Southern Hemisphere:  $H = 0$ ,  $V = -0.52_{\pm 0.05}G$ ,  $Z = 0$

Conditions for visual testing, unless otherwise stated:

Input video signal	- 700 mVp-p cross hatch
Brightness control	- 50%
Contrast control	- Adjust to 31+/- 2.5 FL of luminance with full white pattern

#### 4.1 Display resolutions

See 3.1.3

#### 4.2 Image size (Factory pre-set modes only)

The dimensions of guaranteed display area to be measured along the picture center of horizontal and vertical axis of the screen as listed below: (preset modes only, refer to Fig- 1/ Fig- 2)

Width : 355 +/- 4 mm .(Fig- 1)

Height : 265 +/- 4 mm .(Fig- 1)

#### 4.3 Image centering deviation (Factory preset modes only)

With respect to Fig- 2, the target relationships are the following:

 $|A - B| \leq 6 \text{ mm}$        $|C - D| \leq 6 \text{ mm}$ 

#### 4.4 Picture shift control range

H-shift range : 10 mm min. (+/- 3mm,from center to each side)  
V-shift range : 8 mm min. (+/- 2mm,from center to each side)

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## 4.5 Picture tilt

With respect to Fig- 3, tilt to be measured on extremes of center line from bezel.

Tilt :  $\leq 2$  mm

## 4.6 Geometric distortions

It is acceptable that pincushion, trapezoid, rhomboid, rotation and various waves distortions must remain within the limits of tolerance as in Fig- 4,

A   ,   B	2.0mm
C   ,   D	2.0mm
A + B	3.5mm
C + D	3.5mm

The waviness of any vertical or horizontal shall be less than 1.0 mm over a 50 mm distance.

## 4.7 Horizontal / Vertical linearity: (preset modes only)

12 equal blocks along horizontal axis,

9 equal blocks along vertical axis. (see Fig-1)

Horizontal frequency	<33KHz	33K~ 65KHz	>65KHz
Horizontal non-linearity:	$\leq 7.5 \%$	$\leq 6.5 \%$	$\leq 6 \%$
Vertical non-linearity:	$\leq 5 \%$	$\leq 5 \%$	$\leq 5 \%$
Horizontal two adjacent:	$\leq 6 \%$	$\leq 6 \%$	$\leq 5 \%$
Vertical two adjacent:	$\leq 5 \%$	$\leq 5 \%$	$\leq 5 \%$

$$H. \text{ linearity} = \frac{X_{\max.} - X_{\min.}}{X_{\max.} + X_{\min.}} \times 100\%$$

$$V. \text{ linearity} = \frac{Y_{\max.} - Y_{\min.}}{Y_{\max.} + Y_{\min.}} \times 100\%$$

## 4.8 Mis-convergence

The maximum convergence error to be measured on a white spot or white display line to represents the maximum distance between the energy centers of any two primary colors. (See Fig- 6)

Mis-Convergence SPEC. Zone A / C is 0.3 / 0.4 When ? 45kHz.

CRT Pitch	0.25mm
Zone A	0.25
Zone C	0.35
Center	0.15

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- 4.9 Focus check (with 91.1KHz/85Hz, 1280 x 1024 mode)  
Generate 9-blocks ME character pattern (Fig-7) to cover entire of the picture area 90mm x 90mm (display size respect to Fig-1), adjust brightness control to 50% and contrast at 100%, the ME character should be clearly identified in all display area.

- 4.10 Luminance uniformity : (68.6k/85hz)  
condition : With full white pattern, set contrast control at max. and adjust brightness control to get 30FL in center..  
the max. deviation to the rest of the screen shall not exceed 25% of entire screen with any point.

- 4.11 White color adjustment  
Based on the 1931 CIE chromaticity (color triangle) diagram (x,y coordination).  
coordination of white display on screen center should be:

for 9300? K      X = 0.283   +/- 0.015  
                         Y = 0.297   +/- 0.015  
for 6500? K      X = 0.313   +/- 0.015  
                         Y = 0.329   +/- 0.015  
for 5500? K      X = 0.332   +/- 0.015  
                         Y = 0.347   +/- 0.015

for sRGB? K      X = 0.313   +/- 0.015  
                         Y = 0.329   +/- 0.015

Check conditions :

Set brightness control at 50% position and contrast at maximum.

sRGB luminance (Full white pattern): at 68.67K/85Hz, regardless of brightness 50% and contrast controls: 23 □ 2.5FL

- 4.12 Color tracking on full white pattern

Ref. to white balance alignment result and set brightness at 50%, adjust contrast control from 5FL to max. position, the color coordinate should not deviate more than following tolerance when compare to display center:

X= X nominal   +/- 0.015

Y= Y nominal   +/- 0.015

- 4.13 Purity

Test patterns: Full White / Red / Green / Blue.

Conditions: As stated in item 4.0, the purity must be checked under specified destinations of earth magnetic environments and the monitor to be well degaussed.

After warming-up time of 30 min., no colored stains may occur in above four patterns.

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## 4.14 Moire

Condition: Displaying a full white pattern at any pre-set mode with Fig 1 dimension .

Moire area should be less than 1/3 area @15FL via moire control.

However the OSD moire data of V-moire should have a default value

(mode dependent) for product outgoing.

## 5.0 Mechanical characteristics

## 5.1 User controls (at front) right to left

- Power ON/OFF
- OSD Menu
- Brightness (with Increase/Decrease)
- Contrast (with Increase/Decrease)

## 6.0 Connectors and cables

## 6.1.1 Power cord (plug-able) type : Wall Plug ,non shielded and non-attached.

Length : 1.8 m +/- 50 mm . Plug curved at 90°.

## 6.1.2 Signal cable

Length of video : 1.8 m +/- 50 mm flying in 15pins D-sub.

## 7.0 Environmental characteristics

The following sections to define the interference and susceptibility condition limits that might occur between external environment and the display device.

## 7.1 Susceptibility of display to external environment

## 7.1.1 Operating limits

- A). Temperature : 0°C to 40°C  
 Humidity : 10 to 90% (W/O condensation)  
 Air pressure : 10000 ~ 39000 ft

## B). Non-operating limits (storage)

- Temperature : -25°C to 65°C  
 Humidity : 5 to 95 % (W/O condensation)  
 Altitude : 10000 ~ 39000 ft

## 7.1.2 Transportation packages

## A) Carton box

## A-1 Size (with pedestal)

526(W)×476(H)×560(D) : Normal packing for China, India

495(W)×466(H)×520(D) : Small packing for other regions

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A-2 Carton paper : double wall AB flute corrugate board, color brown

Bursting : 19.3 kgf/cm<sup>2</sup> min

Compression : 850 kgf min

Punching strength: 108 Kgf-cm

B) Transportation conditions

B-1 Container loading (separated pedestal), normal packing for China, India

Q'ty	Container size				
	40'		20'		40' High Cube
	W/ Pallet		W/ Pallet		W/ Pallet
	Yes	No	Yes	No	No
Layers	4	4	4	4	5
Sets / Layer	4	4	4	4	4
Sets / Block	16	16	16	16	20
Blocks/Container	22	22	10	10	20
Total Sets	352	352	160	160	440

B-2 Container loading (separated pedestal), Small packing for other regions

Qty	Container size											
	40'			20'			40' High Cube			PWHC 45'		
	W/ Pallet		W/ SLIP SHEET	W/ Pallet		W/ SLIP SHEET	W/ Pallet		W/ SLIP SHEET	W/ Pallet		W/ SLIP SHEET
	Yes	No		Yes	No		Yes	No		Yes	No	
Layers	4	4	4	4	4	-	5	5	5		5	5
Sets / Layer(PA)	4	4	4	4	4	-	4	4	4		4	4
Sets / Layer(PB)	-	-	-	2	2	-	-	-	-		-	-
Sets / Block(PA)	16	16	16	16	16	-	20	20	20		20	20
Sets / Block(PB)	-	-	-	8	8	-	-	-	-		-	-
Blocks / Container(PA)	24	24	24	10	10	-	24	24	24		26	26
Blocks / Container(PB)	-	-	-	2	2	-	-	-	-		-	-
Total Sets	384	384	384	176	176	-	480	480	480		520	520

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## GENERAL PRODUCT SPECIFICATION

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## B-3 Transportation standards

(Test conditions: ambient temperature 20 -23°C, relative humidity 40-65%)

Standards	PCE All Regions Except China & India PCE Standard		PCE China & India PCE Standard
Vibration test (4 sets)	Sequence	7Hz, 1.05G Amplitude(peak to peak): 10.6mm Duration: 30 min. 1 axes (transport direction)	5~200 Hz, 0.73Grms 30 min./ axis , 3axes (ref. ASTM D-4169)
Drop test (4 sets)	Height	38/25 cm (weight: 20.38kg )	50/40/35 cm (weight:18.1-30kg )
	Sequence	Bottom(3 times): 38cm, Left/Front/Right/Rear/Top: 25cm	6 face (bottom-top-left-right-front-rear) Corner : right-bottom-front 3 edge(front-right, right-btm, front-btm) Front & bottom face : 50cm Top face : 40cm Other face, corner & edges : 35 cm
Cold Drop test (2set refers only)			( cold drop test: pre-condition for 16 hours at -10° C) 1 <sup>st</sup> set Corner : right-rear-top 3 face(top, right, rear)  2 <sup>nd</sup> set Corner : left-front-bottom 3 face (left, front ,bottom)  Front & bottom face : 50cm Top face : 40cm Other face, corner & edges : 35 cm
	Result	- Electrical function OK. - Mechanical function OK. - No serious damage in set	
Shock test	For design evaluation only. Half sine shock Temp. Humidity Air pressure Standard	: 100G, <3m sec. 6 shocks : 23°C : 60 % :100kpa : Mechanical Guideline	

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## 7.2 Display disturbances from external environment

## 7.2.1 ESD Disturbances

According to IEC65 (also refer to IEC801-2 for detail).

## 7.3 Display disturbances to external environment

The disturbances induced by the display and tolerated by the environment are defined as follows:

## 7.3.1 Ionization radiation

Completely fulfilled International Commission of Radio logical Protection (ICRP) requirement 0.5 mr/hrs.  
Actually the set can reach 0.1 mr/hrs.

## 7.3.2 Safety and EMI requirements

Safety	- USA	:UL 1950
	-CANADA	:CSA C22.2 NO.950-M89
	-NORDIC	:IEC950
		:EN60950
		:SEMKO TSE (74SEC) 207/94
	-EUROPE	:CE
	-Poland	:PCBC
	-Singapore	:PSB
	-Germany	:TUV

EMI	-USA	:FCC PART 15 Class B
	-CANADA	:D.O.C. Class B
	-CE	:EN55022 CLASS B
		:C-tick

EMS EN61000-4-3 (80% 1KHz AM modulation) picture jitter ? 4mm

Ergonomics	:E2000, EPA, Nutek
	ISO 9241-3&8, 9241-7, TCO-99

Compatibility	: PC99, Windows 2000, Windows ME, PC2001
	Windows XP.

LOW EMISSION	: MPRII / TCO
--------------	---------------

## 7.3.3 X-RAY radiation requirement /regulation

-USA/CANADA	:DHHS 21 CFR, CHAPTER 1,SUBCHAPTER J
-GERMANY	:RONTGEN VERORDNUNG ROV 1987.01.08

X-ray exposure at 5cm distance from any point of the external surface must not exceed 0.1 mR/H.

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## 8.0 Reliability

## 8.1 Mean time between failures

MTBF to be calculated according to Military standard  
MIL-HDBK-217C.

MTBF  $\geq$  75,000 Hours (Excluding CRT)

$$\text{PRACTICE of MTBF} = \frac{\text{TOTAL HRS (POWER ON) X TOTAL SETS}}{\text{NBR. OF FAILED SETS}}$$

## 9.0 Quality assurance requirements

## 9.1 Acceptance test

According to MIL-STD-105D level II,  
AQL : 0.65 (Major)  
2.5 (Minor)

Customer acceptance :  
criteria : UAW0377/00

Target Field repair rate : <2%

## 10.0 Serviceability

The service ability of this monitor should fulfill the requirements which are prescribed in UAW-0346 and must be checked with the check list UAT-0361.

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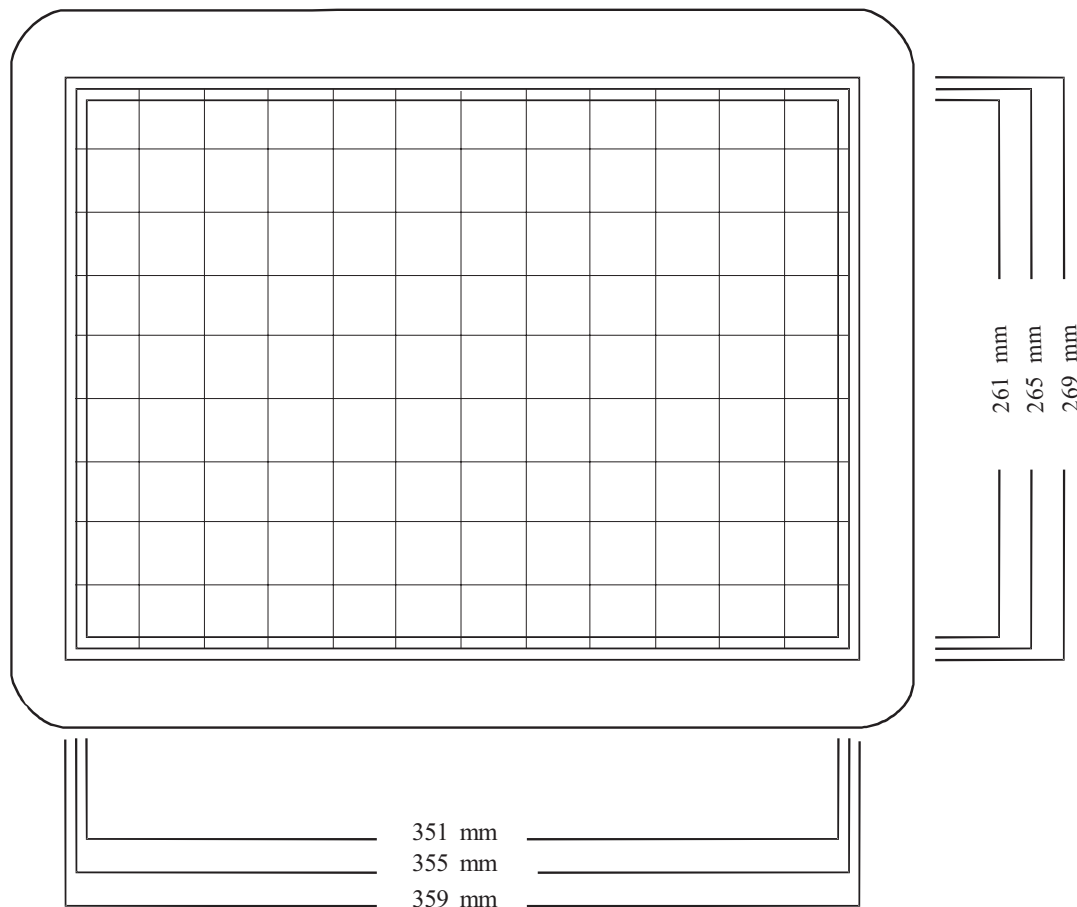
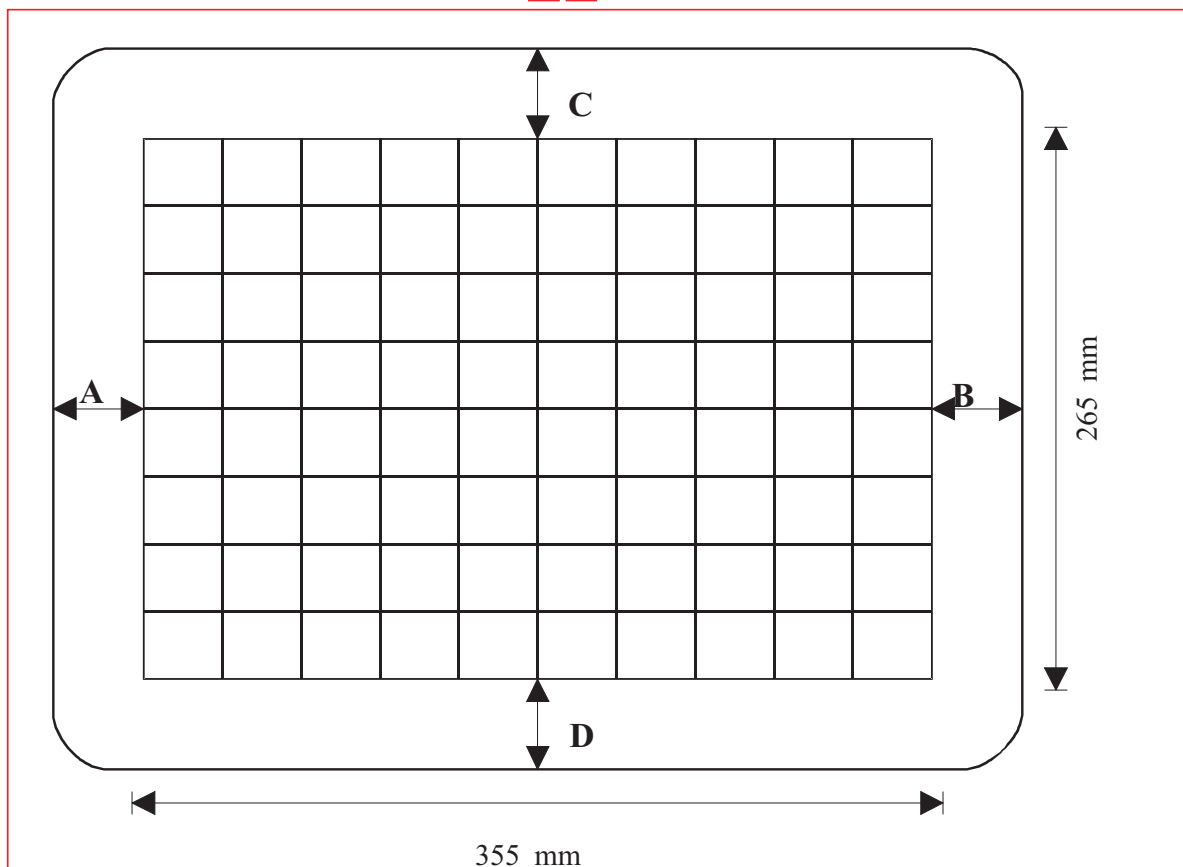


Fig-1 IMAGE DIMENSION

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**FIG-2 IMAGE CENTERING**

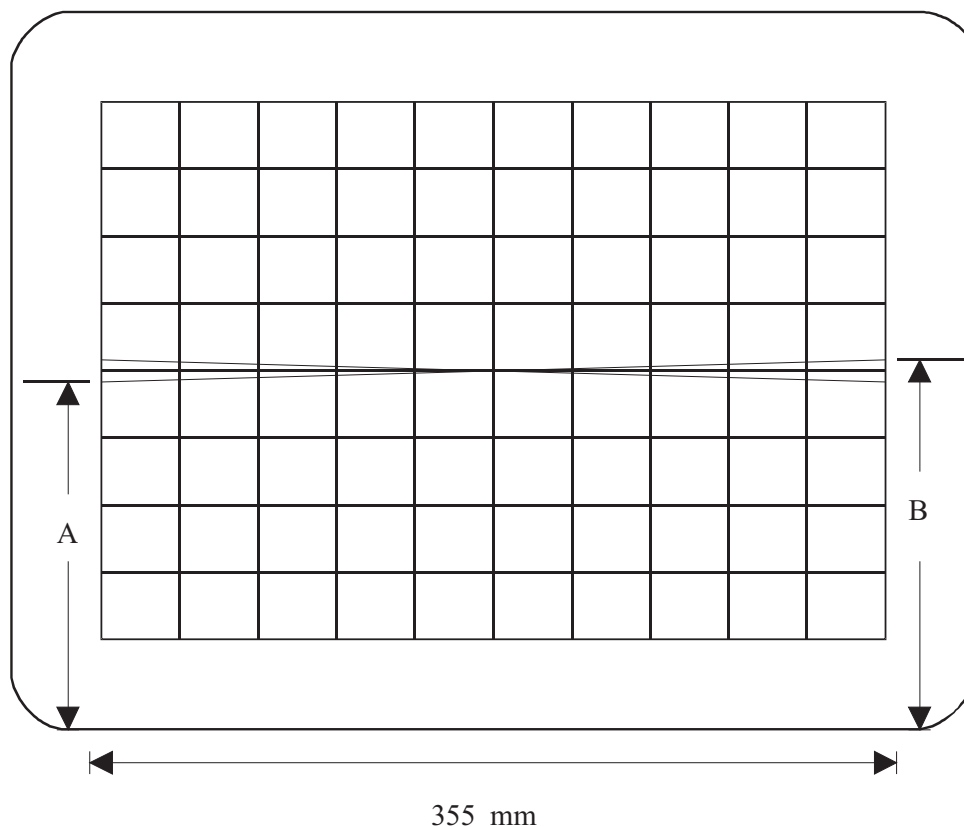
CLASS NO.		V40 109B6 97KHZ		8639 000 15742	
		TYPE :109B60/00			
		BRAND : PHILIPS			
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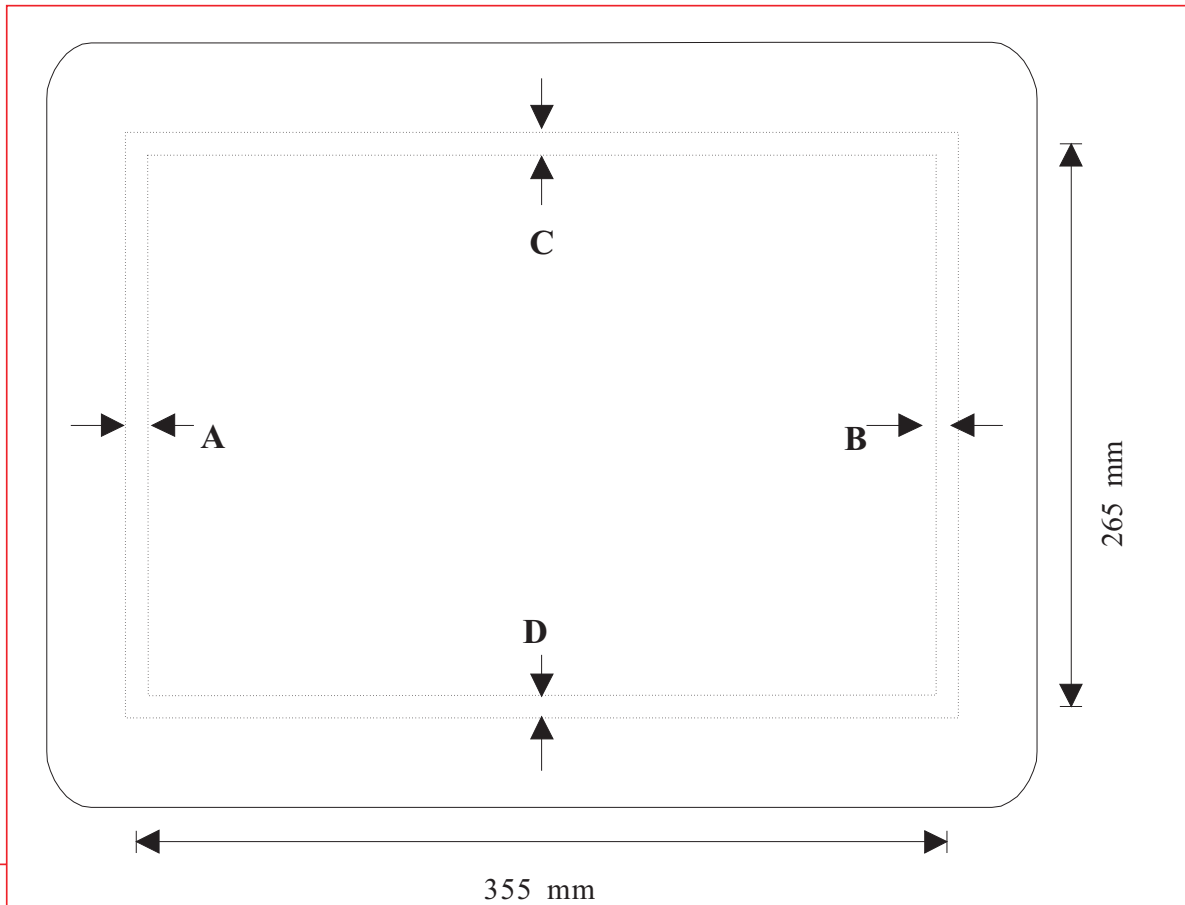
$$|A-B| < 2 \text{ mm}$$

FIG-3 IMAGE ROTATION

CLASS NO.		V40 109B6 97KHZ		8639 000 15742	
		TYPE :109B60/00			
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$A, B < 2.0 \text{ mm}$      $C, D < 2.0 \text{ mm}$

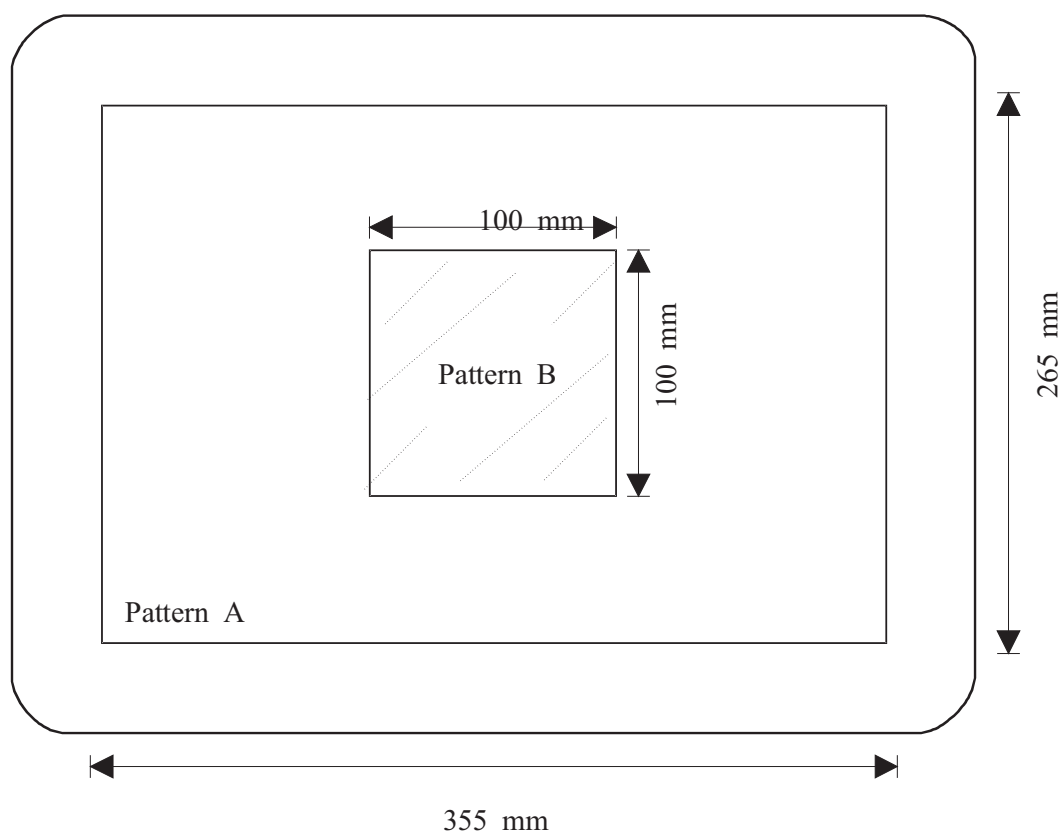
**FIG-4 IMAGE GEOMETRY**

CLASS NO.		V40 109B6 97KHZ			
		TYPE :109B60/00		8639 000 15742	
		BRAND : PHILIPS			
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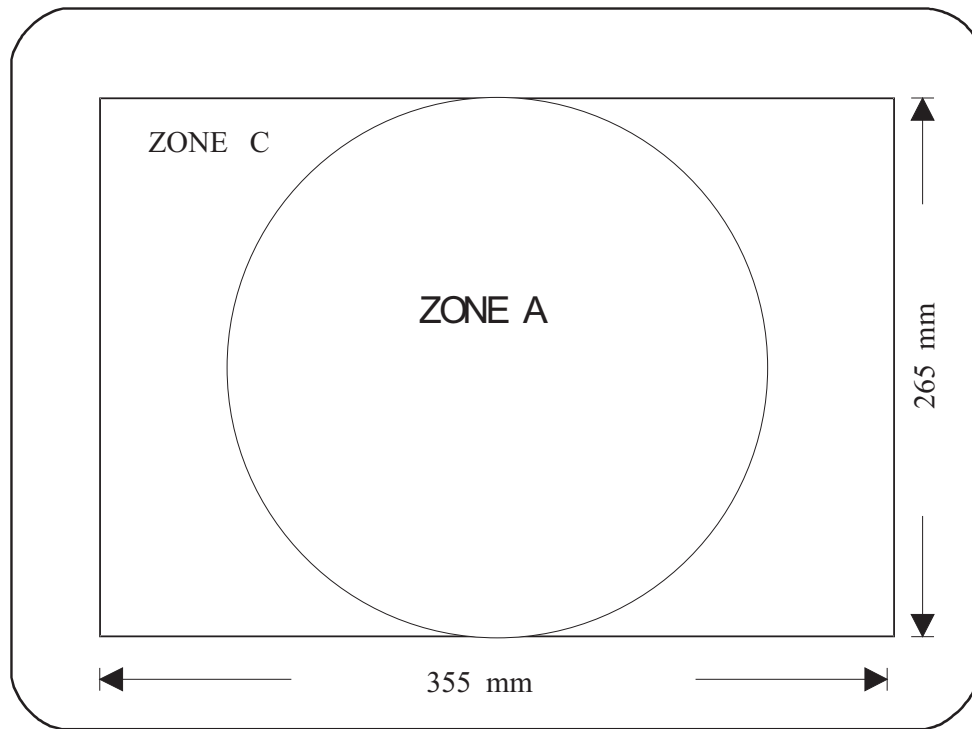
**FIG-5 CONTRAST AND BRIGHTNESS  
MEASUREMENT PATTERNS**

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		TYPE :109B60/00			
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**FIG-6 MISCONVERGENCE  
MEASUREMENT AREA**

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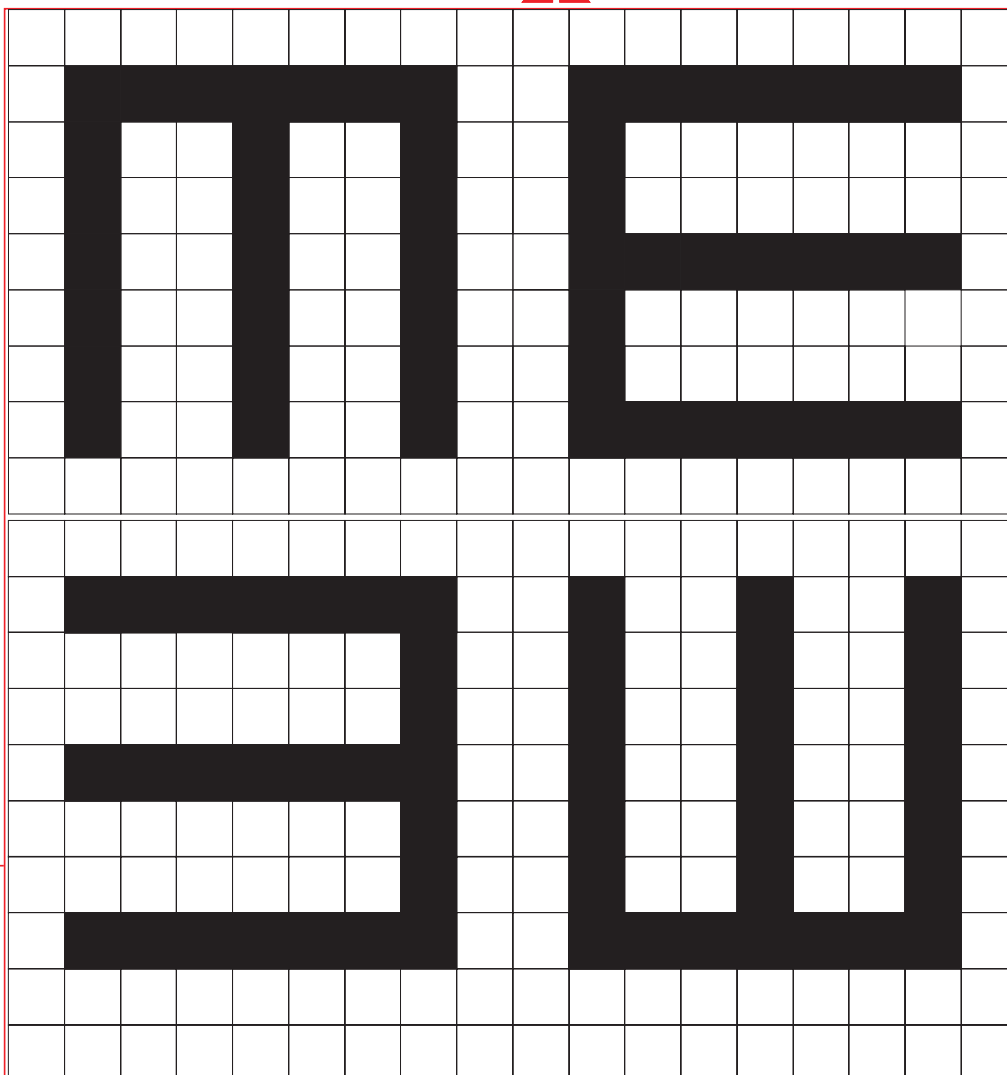


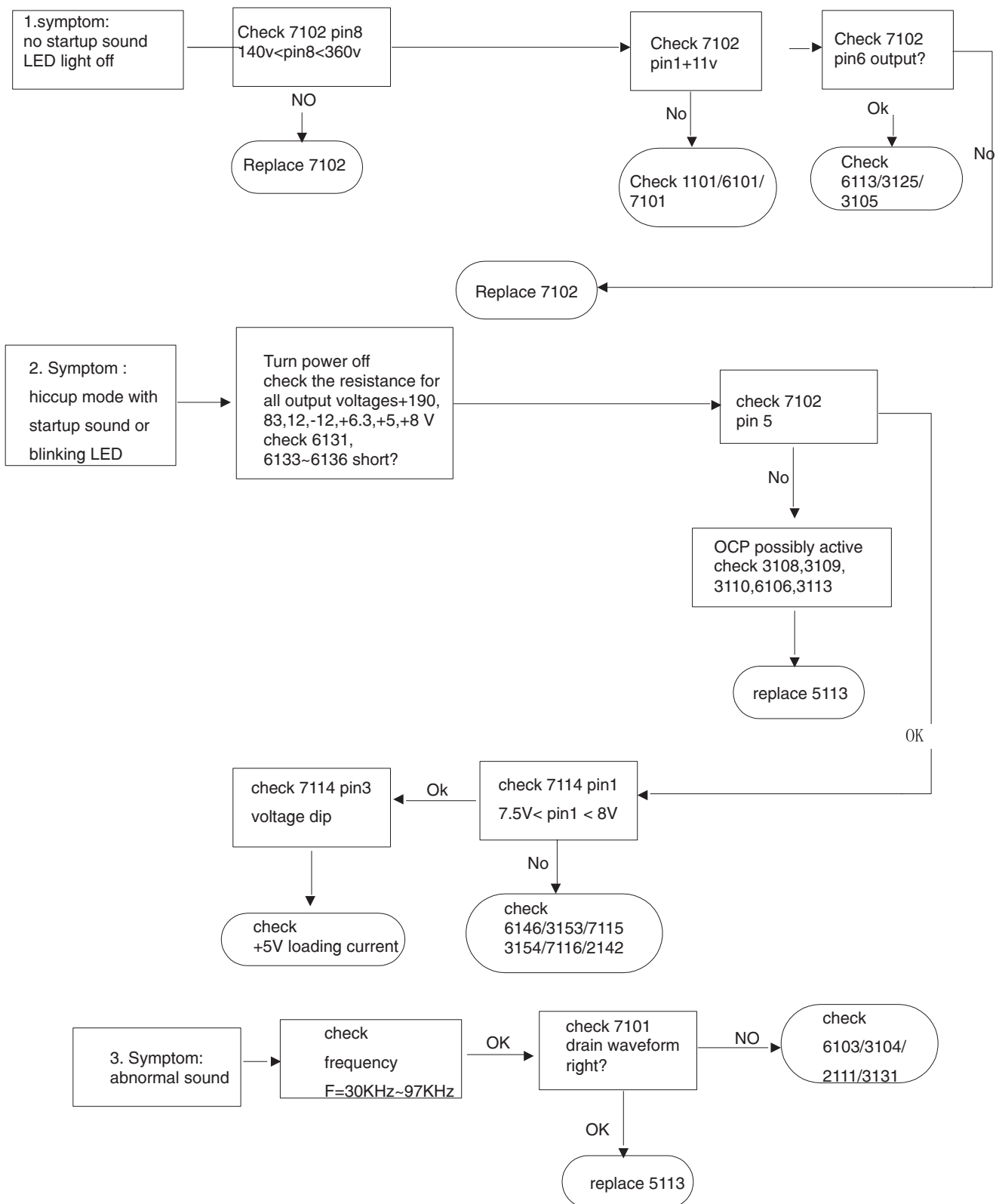
Fig7 FOCUS CHECK CHARACTER

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		TYPE :109B60/00			
		BRAND : PHILIPS			
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## Repair Flow Chart

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## A. Power Supply Failure



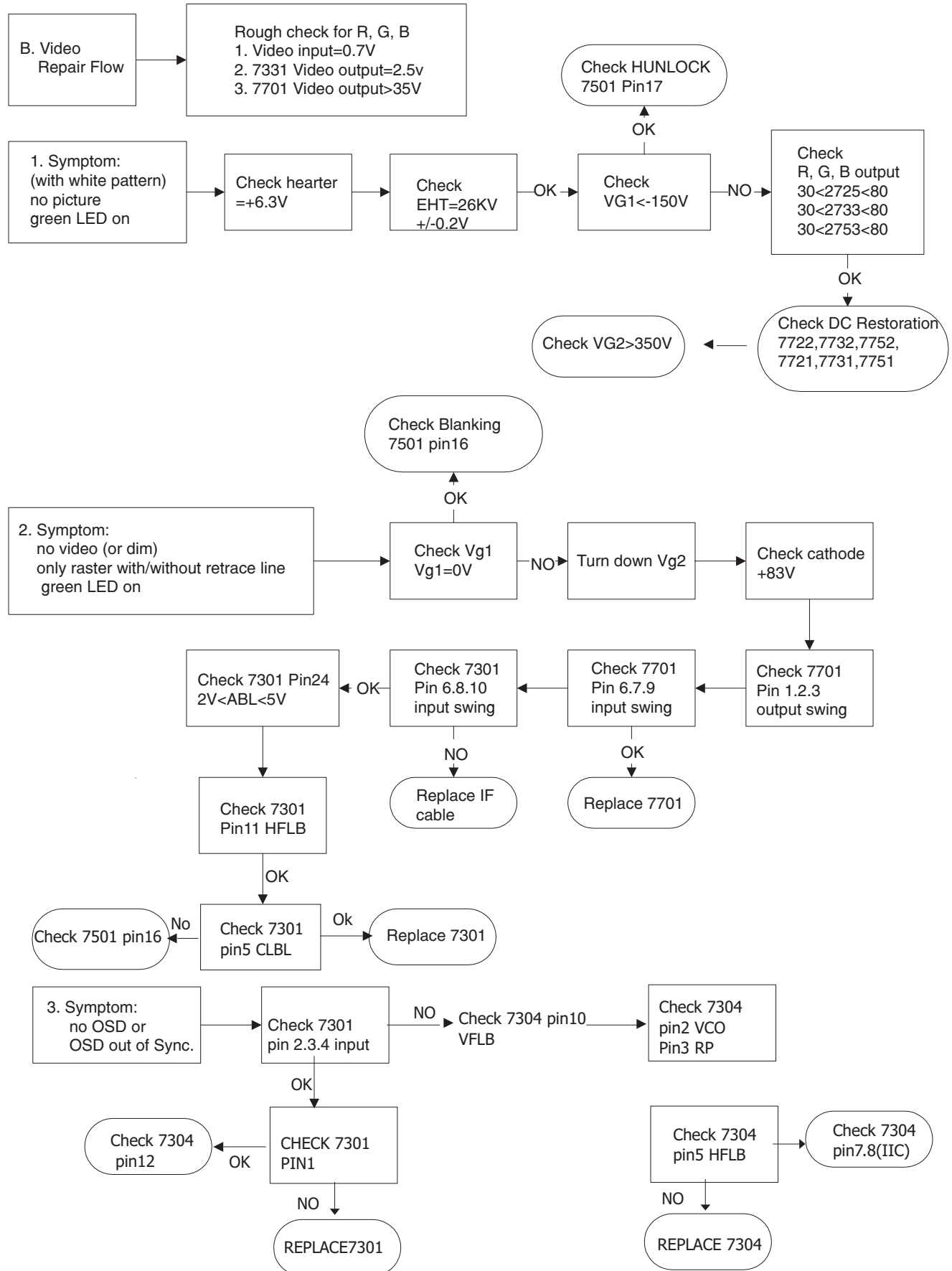


# Repair Flow Chart

109B6 CRT

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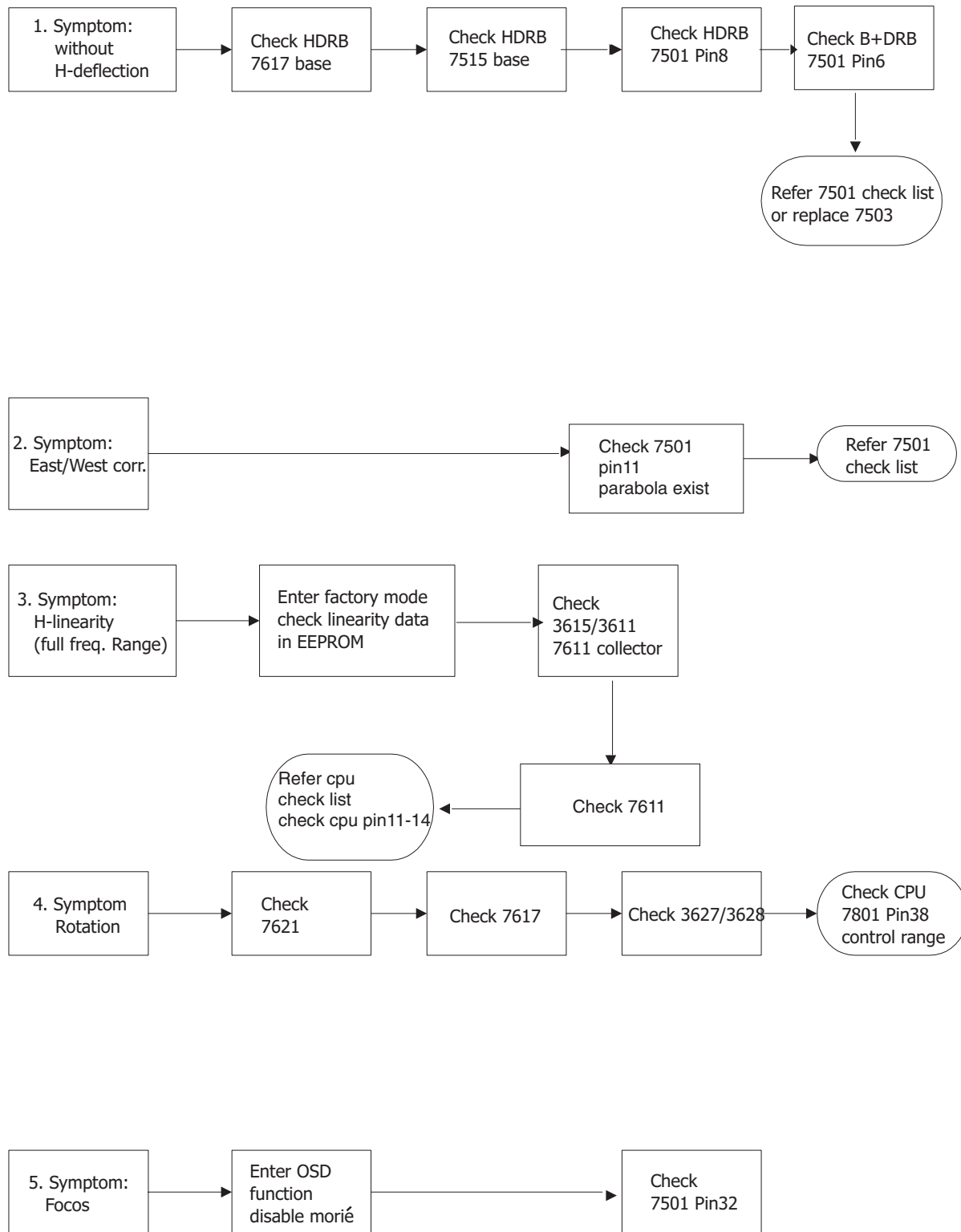
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## Repair Flow Chart (Continued)

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C. Horizontal deflection  
output repair flow:

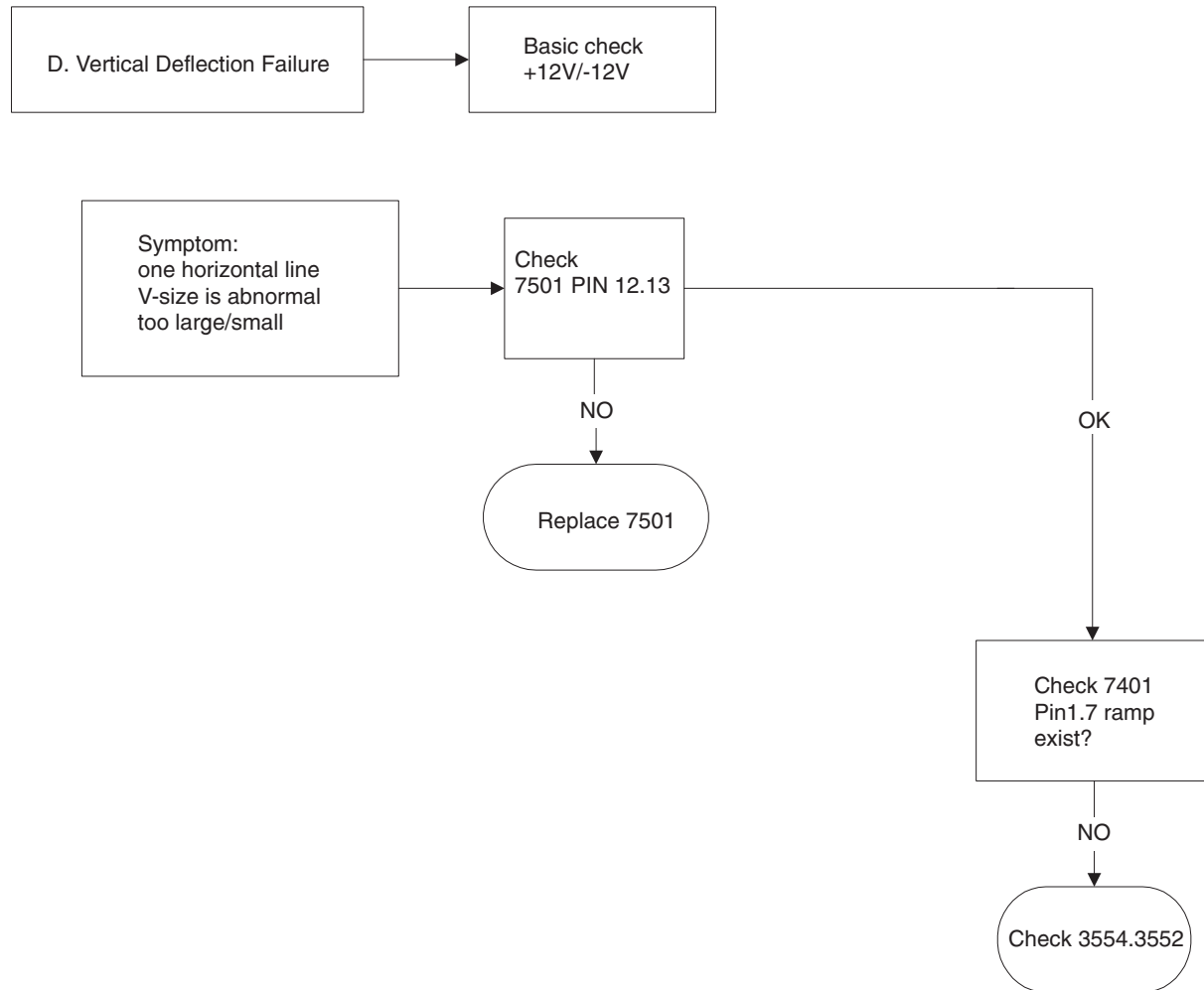


# Repair Flow Chart

109B6 CRT

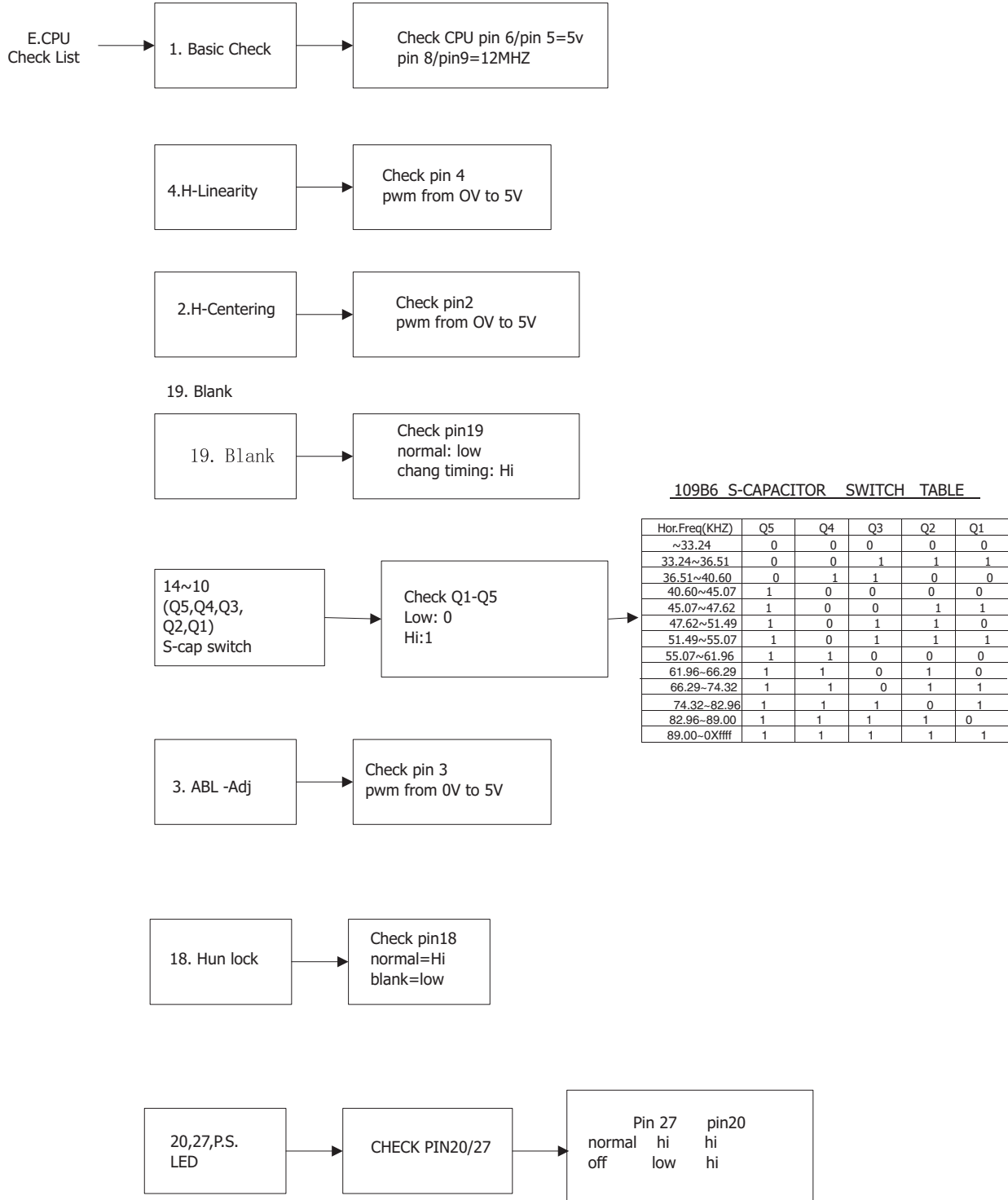
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## Repair Flow Chart

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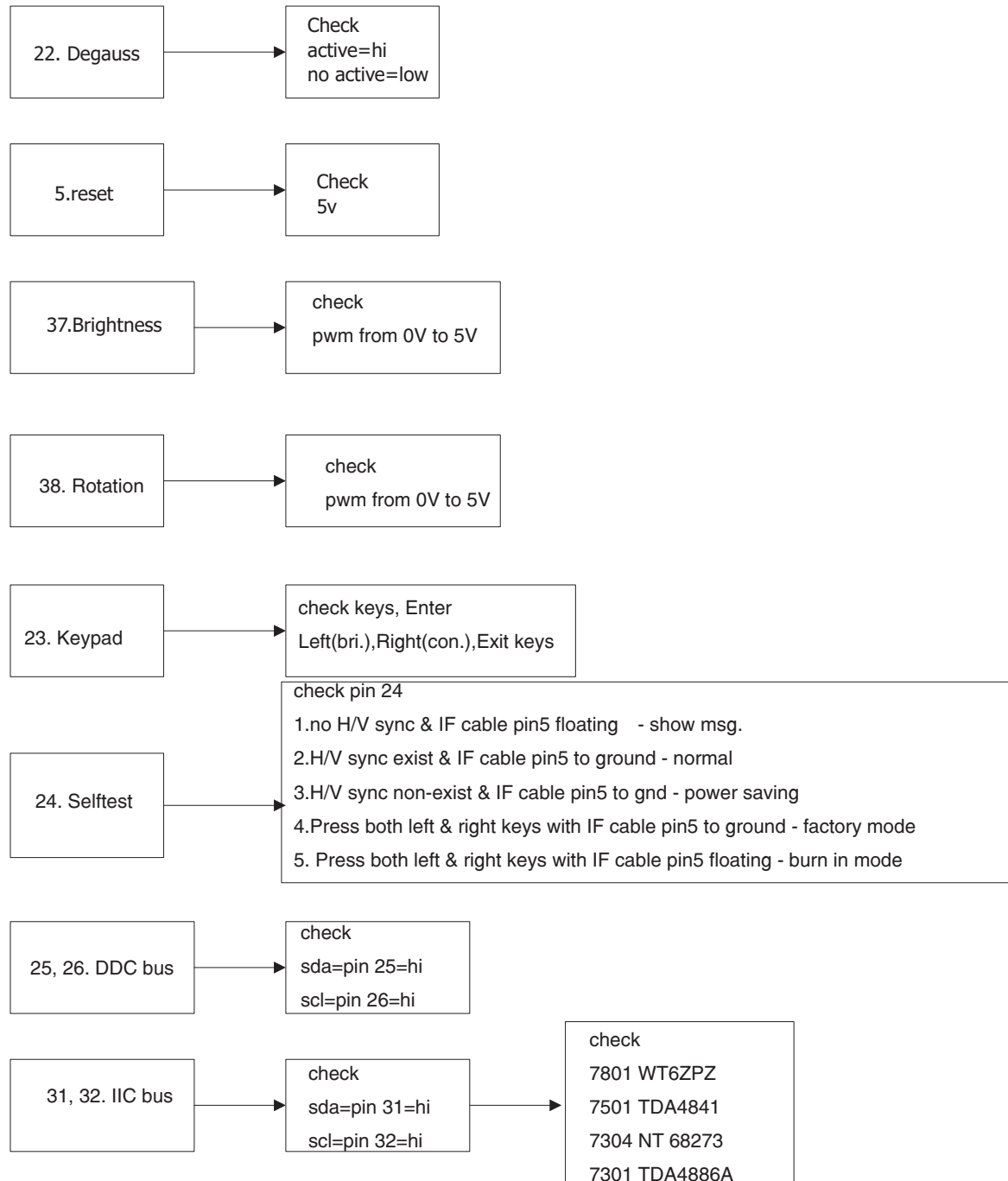


# Repair Flow Chart

109B6 CRT

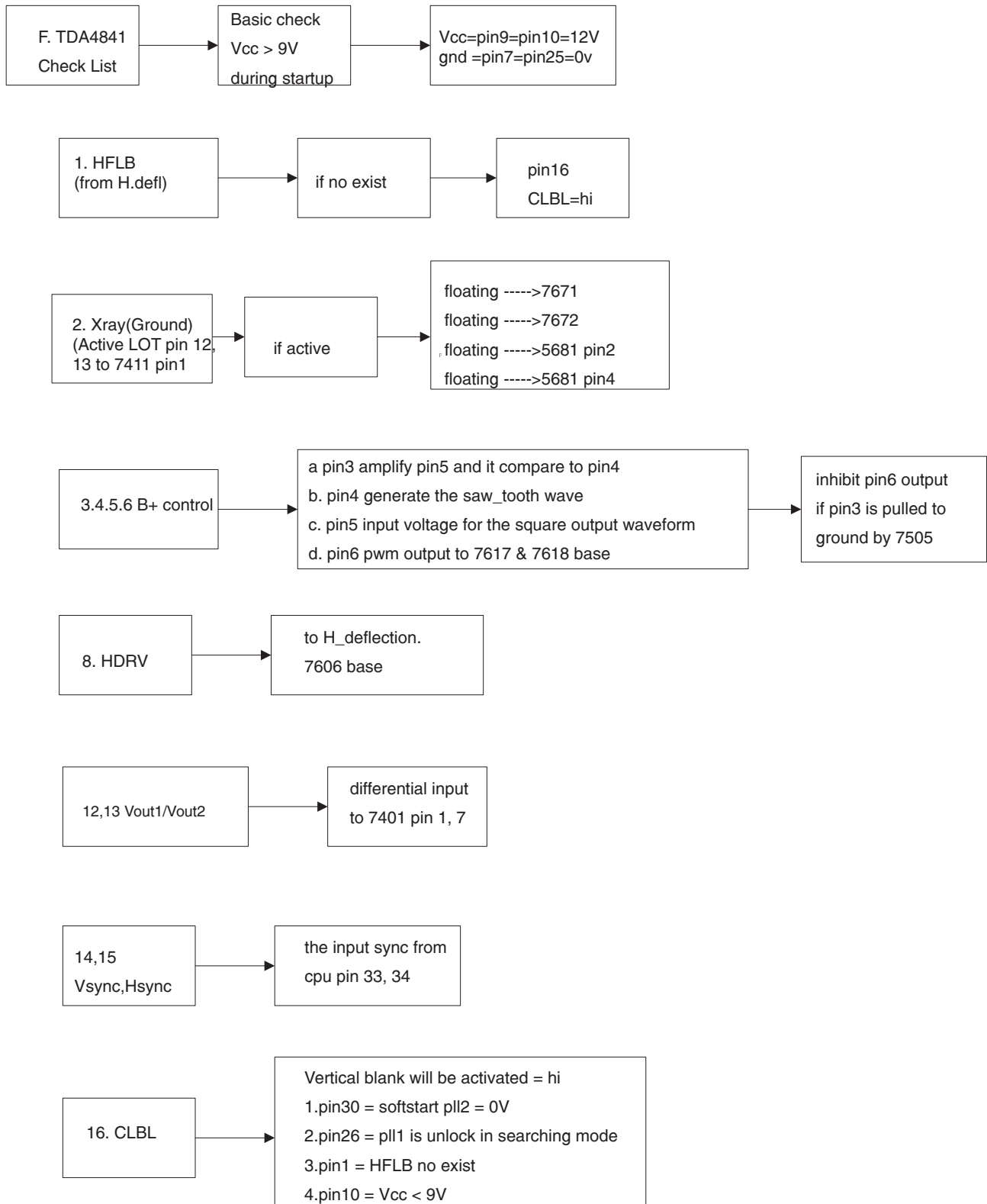
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## Repair Flow Chart

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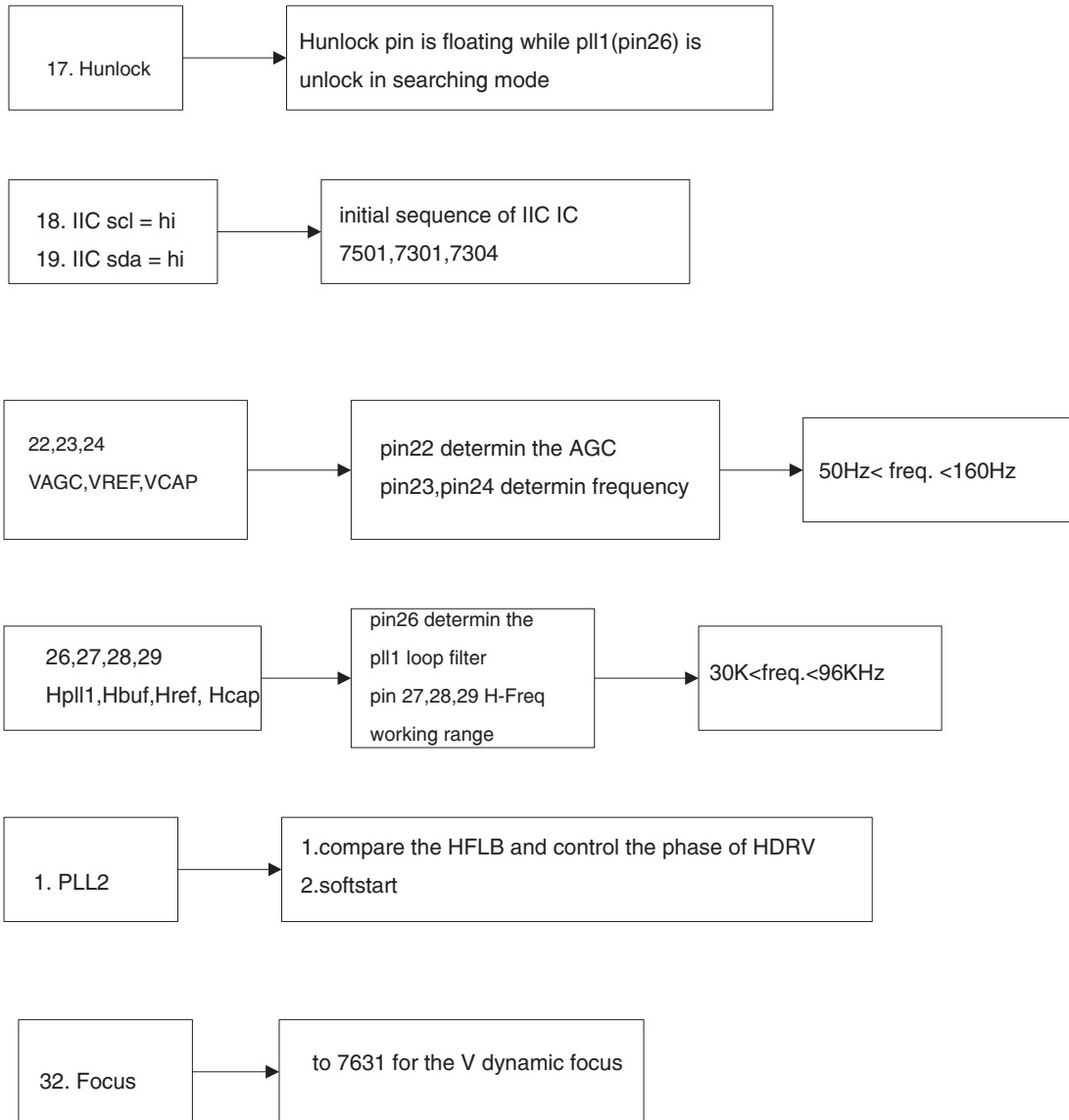


# Repair Flow Chart

109B6 CRT

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## Different Parts List

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## Diversity of 109B60/05 comparing with 109B60/00

1053	313818878182	MAINSCORD ASTA 10A 1M83	GY
1255	313817880951	EEPROM ASSY (CPT-109B6)	
0213	313811580851	LABEL-EEPROM(CPT)	
1801	243803100063	CON V 4P M 2.50	625/635 B
1402	243803100116	CON V 3P M 2.50	63172 B
1604	243803100061	CON V 2P M 2.50	625/635 B
1681	243803100097	CON V 2P M 2.50	63842 B
0044	313810459492	BASE	

## Diversity of 109B60/27 comparing with 109B60/00

0450	313810663711	CARTON	
1053	313812876071	MAINSCORD UL 10A 1M8 DET	GY
1255	313817880951	EEPROM ASSY (CPT-109B6)	
0213	313811580851	LABEL-EEPROM(CPT)	

## Diversity of 109B60/75 comparing with 109B60/00

1151	930198410323	CRT M46QEF903X21(T)S (LGPD)	B
3726	212210101512	RST CRB CF1/6	A 1M PM5 A
3734	212210101512	RST CRB CF1/6	A 1M PM5 A
3752	212210101512	RST CRB CF1/6	A 1M PM5 A
0153	313810658051	P.E.BAG/ E-D.F.U.	
0178	313810540863	SETTING UP GUIDE	
0602	313811707751	E-D.F.U.	
1053	313819872941	MAINSCORD AUS/NZ 10A 1M8	GY
1151	823827446361	CRT M46AJS53X46R(SMV)	
1255	313817880951	EEPROM ASSY (CPT-109B6)	
0213	313811580851	LABEL-EEPROM(CPT)	
1151	823827446371	CRT M46QCK761X214(TCO/DFT-M500	

## Diversity of 109B65/27 comparing with 109B60/00

0450	313810663711	CARTON	
1053	313818870491	MAINSCORD UL 10A 1M8 DET	BK
1152	313817880971	MB-1 ASSY (LPD-109B6)B	
1054	313818878051	CORD SUB-D 15/1M8/12 330942	BK
1152	313817880981	MB-2 ASSY (CPT-109B6)B	
1255	313817880951	EEPROM ASSY (CPT-109B6)	
0213	313811580851	LABEL-EEPROM(CPT)	
1152	313817880991	MB-3 ASSY (SDI-109B6)B	
0001	313812755191	FRONT CABINET ASSY	
0004	313812754071	CHIN ASSY-BLK	
0003	313812754002	PEDESTAL ASSY (BLK)	

## Diversity of 109B65/75 comparing with 109B60/00

1151	930198410323	CRT M46QEF903X21(T)S (LGPD)	B
1152	313817880971	MB-1 ASSY (LPD-109B6)B	
1054	313818878051	CORD SUB-D 15/1M8/12 330942	BK
3752	212210101512	RST CRB CF1/6	A 1M PM5 A
3726	212210101512	RST CRB CF1/6	A 1M PM5 A
3734	212210101512	RST CRB CF1/6	A 1M PM5 A
0001	313812755191	FRONT CABINET ASSY	
0004	313812754071	CHIN ASSY-BLK	
0042	313810461141	BACK COVER-BLK	
0003	313812754002	PEDESTAL ASSY (BLK)	
1053	313819872611	MAINSCORD AUS/NZ 7A5 1M8	BK
1151	823827446361	CRT M46AJS53X46R(SMV)	
1152	313817880981	MB-2 ASSY (CPT-109B6)B	
1255	313817880951	EEPROM ASSY (CPT-109B6)	
0213	313811580851	LABEL-EEPROM(CPT)	
1151	823827446371	CRT M46QCK761X214(TCO/DFT-M500	
1152	313817880991	MB-3 ASSY (SDI-109B6)B	
1253	313817869891	HOR. T/R ASSY (109B6)	
1254	313817865331	VER.IC ASSY	

## TELEVISION/MONITOR SAFETY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

### Safety Checks

After the original service problem has been corrected, a complete safety check should be made. Be sure to check over the entire set, not just the areas where you have worked. Some previous service may have left an unsafe condition, which could be unknowingly passed on to your customer. Be sure to check all of the following:

#### Fire and Shock Hazard

1. Be sure all components are positioned in such a way as to avoid the possibility of adjacent component shorts. This is especially important on those chassis which are transported to and from the service shop.
2. Never release a repaired unit unless all protective devices such as insulators, barriers, covers, strain reliefs, and other hardware have been installed in accordance with the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints, solder splashes, sharp solder points, frayed leads, pinched leads, or damaged insulation (including the ac cord). Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout, lead length, and dress.
5. No lead or component should touch a receiving tube or a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with an asterisk by the Ref. No. in the parts list and enclosed within a broken line \* (where several critical components are grouped in one area) along with the safety symbols on the schematic diagrams and/or exploded views.
7. When servicing any unit, always use a separate isolation transformer for the chassis. Failure to use a separate isolation transformer may expose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many electronic products use a polarized ac line cord (one wide pin on the plug.) Defeating this safety feature may create a potential hazard to the service and the user. Extension cords which do not incorporate the polarizing feature should never be used.
9. After reassembly of the unit, always perform a leakage test or resistance test from the line cord to all exposed metal parts of the cabinet. Also check all metal control shafts (with knobs removed), antenna terminals, handles, screws, etc. to be sure the unit may be safely operated without danger of electrical shock.

\* Broken line

#### Implosion

1. All picture tubes used in current model receivers are equipped with an integral implosion system. Care should always be used, and safety glasses worn, whenever handling any picture tube. Avoid scratching or otherwise damaging the picture tube during installation.
2. Use only replacement tubes specified by the manufacturer.

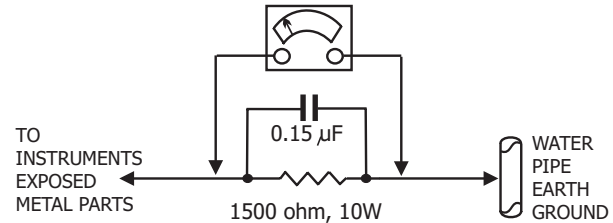
#### X-radiation

1. Be sure procedures and instructions to all your service personnel cover the subject of X-radiation. Potential sources of X-rays in TV receivers are the picture tube and the high voltage circuits. The basic precaution which must be exercised is to keep the high voltage at the factory recommended level.
2. To avoid possible exposure to X-radiation and electrical shock, only the manufacturer's specified anode connectors must be used.
3. It is essential that the service technician has an accurate HV meter available at all times. The calibration of this meter should be checked periodically against a reference standard.
4. When the HV circuitry is operating properly there is no possibility of an X-radiation problem. High voltage should always be kept at the manufacturer's rated value - no higher - for optimum performance. Every time a color set is serviced, the brightness should be run up and down while monitoring the HV with a meter to be certain that the HV is regulated correctly and does not exceed the specified value. We suggest that you and your technicians review test procedures so that HV and HV regulation are always checked as a standard servicing procedure, and the reason for this prudent routine is clearly understood by everyone. It is important to use an accurate and reliable HV meter. It is recommended that the HV recorded on each customer's invoice, which will demonstrate a proper concern for the customer's safety.
5. When troubleshooting and making test measurements in a receiver with a problem of excessive high voltage, reduce the line voltage by means of a Variac to bring the HV into acceptable limits while troubleshooting. Do

6. New picture tubes are specifically designed to withstand higher operating voltages without creating undesirable X-radiation. It is strongly recommended that any shop test fixture which is to be used with the new higher voltage chassis be equipped with one of the new type tubes designed for this service. Addition of a permanently connected HV meter to the shop test fixture is advisable. The CRT types used in these new sets should never be replaced with any other types, as this may result in excessive X-radiation.
7. It is essential to use the specified picture tube to avoid a possible X-radiation problem.
8. Most TV receivers contain some type of emergency "Hold Down" circuit to prevent HV from rising to excessive levels in the presence of a failure mode. These various circuits should be understood by all technicians servicing them, especially since many hold down circuits are inoperative as long as the receiver performs normally.

#### Leakage Current Cold Check

1. Unplug the ac line cord and connect a jumper between the two prongs of the plug.
2. Turn on the power switch.
3. Measure the resistance value between the jumpered ac plug and all exposed cabinet parts of the receiver, such as screw heads, antennas, and control shafts. When the exposed metallic part has a return path to the chassis, the reading should be between 1 megohm and 5.2 megohms. When the exposed metal does not have a return path to the chassis, the reading must be infinity. Remove the jumper from the ac line cord.



#### Leakage Current Hot Check

1. Do not use an isolation transformer for this test. Plug the completely reassembled receiver directly into the ac outlet.
2. Connect a 1.5k, 10W resistor paralleled by a 0.15µf. capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohms volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 milliamperes. If a measurement is outside of the specified limits, there is a possibility of shock hazard. The receiver should be repaired and rechecked before returning it to the customer.
5. Repeat the above procedure with the ac plug reversed. (Note: An ac adapter is necessary when a polarized plug is used. Do not defeat the polarizing feature of the plug.)

#### Picture Tube Replacement

The primary source of X-radiation in this television receiver is the picture tube. The picture tube utilized in this chassis is specially constructed to limit X-radiation emissions. For continued X-radiation protection, the replacement tube must be the same type as the original, including suffix letter, or a Philips approved type.

#### Parts Replacement

Many electrical and mechanical parts in Philips television sets have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The use of a substitute part which does not have the same safety characteristics as the Philips recommended replacement part shown in this service manual may create shock, fire, or other hazards.

**WARNING :** Before removing the CRT anode cap, turn the unit **OFF** and short the HIGH VOLTAGE to the CRT DAG ground.  
**SERVICE NOTE :** The CRT DAG is not at chassis ground.